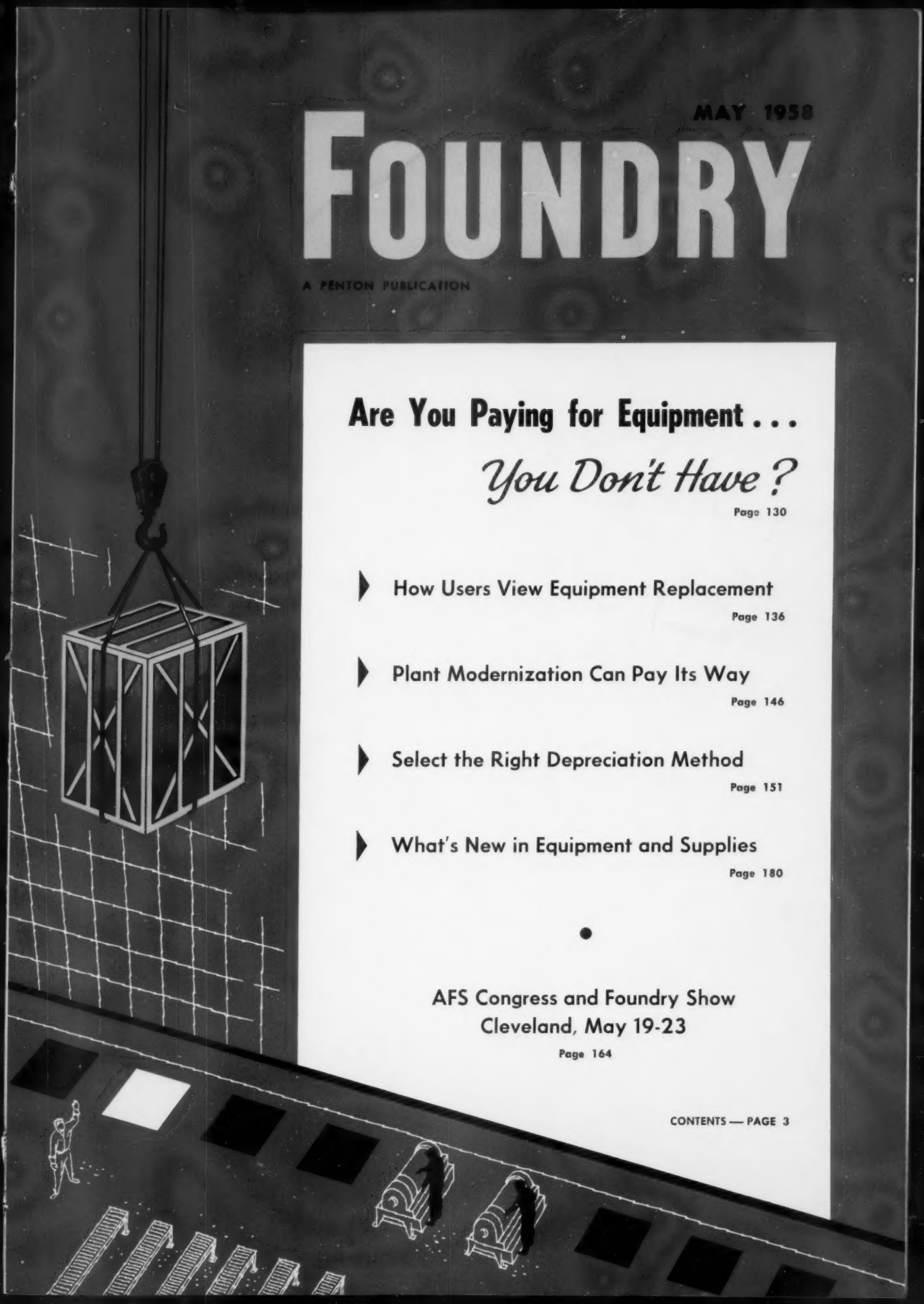
MAY 1958

FOUNDRY

A PENTON PUBLICATION



Are You Paying for Equipment . . .

You Don't Have?

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- Plant Modernization Can Pay Its Way — Page 146
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- What's New in Equipment and Supplies — Page 180

●

AFS Congress and Foundry Show
Cleveland, May 19-23

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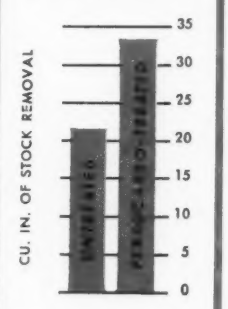
PROVED BY INDEPENDENT LABORATORY TESTS:

63% S·M·I*

for FERROCARBO®-TREATED MALLEABLE IRON

These important test results were obtained by a widely-known independent research laboratory on malleable iron castings produced by a large Midwest foundry, using untreated and FERROCARBO-treated iron of identical chemistry.

Chemical Analyses	Untreated	Ferrocarbo® Treated
TC	2.48	2.48
Si	1.30	1.40
Cutting speed (ft./min.)	185	185
Feed (in./rev.)	.009	.009
Depth of cut (in.)	.062	.062
Wear Land (in.)	.060	.060
Vol. of metal removed (cu. in.)	20.4	33.1
Weight of metal removed (lbs.)	5.2	8.5
Percent improvement		63.0%



* Surface Machinability Improvement
Tool wear tests were conducted with high speed tools of the M-2 type on castings machined at commercial speeds. Flank wear was measured with a 20 power microscope.

MALLEABLE IRON FOUNDRIES are now assured of superior castings regardless of the melting process — whether cupola, duplex, or air furnace — by the use of FERROCARBO, the patented additive by CARBORUNDUM. Various machining tests conducted under controlled conditions prove conclusively that FERROCARBO deoxidation makes possible the reduction or complete elimination of many of the casting difficulties experienced with undeoxidized malleable iron. For example...

- **INCREASED FLUIDITY** is readily apparent. Tests show a fluidity spiral increase over untreated irons. This means less mis-run castings.
- **GRAIN STRUCTURE** is also considerably improved with the dentritic pattern less pronounced in the test sprue. This means more uniform analysis, particularly in cupola or duplex operations.
- **MORE STEEL SCRAP** can be used and improved machinability obtained. This means better castings at less cost.

WRITE FOR MORE INFORMATION on how FERROCARBO produces more machinable iron regardless of metal composition. Ask for booklet A-1409, Electro Minerals Division, The Carborundum Company, Niagara Falls, N.Y.

VISIT OUR BOOTH at the 62nd Castings Congress and Foundry Show (Booth 524) Cleveland, May 19-23.

ELECTRO MINERALS DIVISION

CARBORUNDUM

REGISTERED TRADEMARK

FERROCARBO DISTRIBUTORS—KERCHNER, MARSHALL & COMPANY, *PITTSBURGH • Cleveland • Buffalo • Detroit Philadelphia • Birmingham • Los Angeles • Canada*

MILLER AND COMPANY, *CHICAGO • St. Louis • Cincinnati*

Circle 551 on Page 51

B.F.Goodrich report:

Photo courtesy of Whirl-Air-Flow Corp., Minneapolis, Minn.

Pipe carries sand the easy way

B. F. Goodrich improvements in rubber brought extra savings

Problem: In this foundry, workmen used to push wheelbarrows loaded with sand to the coremakers. Now the sand is simply blown through those overhead pipes to hoppers all over the building. Only one trouble.

A flexible hose was needed to switch the sand from one pipeline to another. (See inset.) Rubber hose was tried. The swirling sand quickly wore holes in it. Another kind stretched so much from the constant flexing that it jammed the switch.

What was done: When a B.F.Goodrich man heard of the problem he recommended a hose, specially developed by B.F.Goodrich to handle rough materials. It is made with a special wear-resisting rubber, so tough it outlasts hard steel 10 to 1 on many jobs. The hose has a specially treated fabric reinforcement that keeps it from stretching.

Savings: The B.F.Goodrich hose was tried. Instead of digging in and cutting, the sharp particles of sand simply bounce off the extra-soft rubber lining. It has now given 2 years of service and shows no signs of wear or stretch. In fact, the company making this equipment is now using only B.F.Goodrich hose.

For information: This hose is one of hundreds of kinds B.F.Goodrich makes for thousands of industrial uses. Your B.F.Goodrich distributor can recommend a hose exactly fitted to meet the special requirements of your work. And, as a factory-trained specialist, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-354, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

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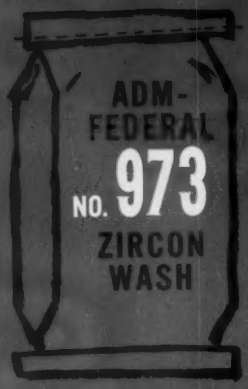
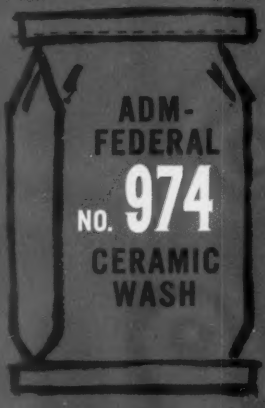
ANNOUNCING...
Three new refractory
ADM·FEDERAL WASHES





These three new ADM-FEDERAL washes have been perfected in our research laboratories to provide positive solutions to your most persistent casting surface problems.

Properly applied, these washes will help eliminate costly burn-in and produce consistently finer, smoother-finish castings with far less cleaning.

FOR CORES AND MOLDS

•

FOR ALL FERROUS AND NON-FERROUS FOUNDRIES

•

FOR SHELL, CO_2, AIR-SET, OR OIL-BONDED SYSTEMS

•

FOR BRUSHING, DIPPING, SWABBING, AND SPRAYING

973 is a water-soluble white powdered pure zircon wash with a working range of 50 to 80° Baume. This is a refractory type wash that resists highest temperatures, thus offering positive protection against metal penetration and burn-in. Except in extreme cases, it is not necessary to use No. 973 zircon wash in its pure state. This wash is completely compatible with No. 974 ceramic wash, and the two may be used in any combination to achieve the desired degree of surface protection. No. 973 zircon wash has excellent suspension properties. Any drying method may be used without developing cracks or blisters.

974 ceramic wash is a white, water soluble refractory-based material in powdered form, having a working range of 28 to 50° Baume. It offers excellent suspension characteristics throughout this wide operating range, and can be torched or oven dried. No. 974 can be blended in combination with No. 973 zircon wash to provide the desired protection at lower cost.

995 SIL-PLAST is a blended plastic refractory-based wash for cores and molds in all types of foundries. Because this material is soluble in either alcohol or water, it is ideal for LINOIL, LIN-O-SET, ADCOSIL, or ADMIREZ cores and molds. In addition, No. 995 SIL-PLAST offers the same wide working range, suspension, and drying characteristics as No. 974 ceramic wash. For ease of handling and elimination of waste, it is packed in 125-lb. polyethylene-lined cartons.

Circle 555 on Page 51

Archer-Daniels-Midland Company
Federal Foundry Supply Division
2191 West 110th Street • Cleveland 2, Ohio

More information, please, on ADM-FEDERAL Wash:

☐ No. 973 ☐ No. 974 ☐ No. 995

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

AIM TOWARD QUALITY CASTINGS
... the answer to *more business*

Archer Daniels Midland company

FEDERAL FOUNDRY SUPPLY DIVISION

2191 West 110th Street • Cleveland 2, Ohio

Producers of core and mold binders, sea coal, sand stabilizers, core and mold coatings, foundry facings, and "San-Blo" equipment

FOUNDRY

A PENTON PUBLICATION

May 1958

Volume 86—Number 5

Editorial 129

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Are You Paying for Equipment You Don't Have? 130

The editors of FOUNDRY present a special series of articles designed to help foundrymen meet the problem of purchasing the proper equipment at the proper time. Individual articles include the following: A discussion of the general problem and its complexities; comments by equipment suppliers, with case histories; explanations by representative foundrymen of the policies followed by their companies, plus examples of typical experiences those companies have had; a detailed description of one foundry's setup before modernization and a look at the proposed changes; and an article on depreciation

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EDITORIAL STAFF

FRANK G. STEINEBACH
Editor

WILLIAM G. GUDE
Managing Editor

EDWIN BREMER
Metallurgical Editor

ROBERT H. HERRMANN
Associate Editor

JACK C. MISKE
Associate Editor

VIRGINIA C. TAYLOR
Assistant Editor

VIRGINIA B. HARMS
Assistant Editor

DON S. CADOT
Art Editor

VINCENT DELPORT
European Editor

MAIN OFFICE

Penton Building
Cleveland 13, Ohio
Main 1-8260

Branch Offices: New York, Detroit, Chicago, Pittsburgh, Washington, and London

(For addresses of branch offices, see Page 415)

FOUNDRY is edited primarily for management, production, technical, and purchasing personnel in foundries. A copy is sent at no cost to each metal casting plant in the U. S. and Canada employing 20 or more workers and to selected smaller foundries. Additional copies are sent to each foundry to the extent necessary to serve all key foundry personnel on a personal or routed basis. A limited number of copies is supplied at no cost to educational institutions.

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If you are aiming toward better castings and higher profits, you might wish to listen in on a...

Public

Because the purchase of corporations is usually conducted behind scenes, people naturally wonder what is going on. Customers of both companies question whether service will be the same; they wonder about product quality; they ask if service personnel will change, etc.

These are reasonable uncertainties. We believe, however, they should be promptly clarified. Therefore, we have chosen to answer publicly the questions frequently asked:

QUESTION: **Will all Federal Foundry Supply Company products still be available?**

ANSWER: Yes. In fact, we hope to expand the product line. The combination of ADM and Federal products makes available the country's most complete line of foundry supplies "under one roof." Whatever the problem or process, ADM has "no axe to grind" for any one system in preference to another. The prescription can fit the diagnosis.

QUESTION: **Who will back up existing Federal purchase agreements, contracts, etc.?**

ANSWER: ADM will guarantee 100% performance in living up to agreements made between Federal Sales and Service personnel and their customers prior to the merger.

Discussion about a Private Matter...

(the merger of ADM and FEDERAL)

QUESTION: **Why the merger? Who is the purchasing company?**

ANSWER: ADM purchased the complete plants and facilities of Federal on August 1, 1957. The new company name is Archer-Daniels-Midland Company, Federal Foundry Supply Division. The merger stemmed from: (1) the industry's growing need for greater technical field service, (2) the need of a single source for a complete line of highest quality foundry supplies, (3) ADM's desire to couple their expanding line of products with unparalleled application know-how.

* * *

QUESTION: **Who will represent Federal supplies in the field?**

ANSWER: The Federal Sales and Service organization has been combined with the ADM field representatives with as few territorial changes as possible. Where changes do exist, every effort is being made to improve your service. The technical knowledge in all district offices has been broadened by the combined knowledge of the Federal and the ADM sales-service teams.

* * *

QUESTION: **Will prices remain the same?**

ANSWER: The price structure as well as the pricing philosophy of ADM will prevail. It has long been our policy to price products as low as is consistent with high quality, competent customer service, and a continuing research program.

Our intention is to provide maximum product value for the price and to encourage profitable application of the product by providing skillfull technical assistance.

ADM and Federal customers will now save through lower distribution costs, lower freight on combination shipments, and in "shopping" time.

* * *

QUESTION: **Will ADM maintain high product quality in the Bentonites, core washes, sea coals, and plumbagos?**

ANSWER: All Federal plants, facilities—and most important—people are now a part of ADM. Added to these are the research and control laboratories of ADM, three of which have recently been installed in Federal plants to insure continuation of product quality and uniformity. Also, ADM has just completed construction of the world's most modern Bentonite processing plant, augmenting Federal's previous large capacity. Customers can thus be assured of continuing close attention to their requirements.

We hope this clarifies the major points of the merger as it concerns our business relationship, and we welcome any suggestions and encourage your comments in the interest of continuing improvement of customer service.

THESE ARE SOME OF THE BETTER-KNOWN TRADE NAMES NOW IDENTIFIED BY THE FAMOUS ARCHER QUALITY TRADEMARK...

GREEN BOND H-J
High-gelatinating Bentonite

GREEN BOND L-J
Low-gelatinating Bentonite

WYOBOND
Pure Western Bentonite (medium gelatinating)

CROWN HILL
Sea Coal

FEDERAL
Sand Stabilizers

LINOIL
Core Oils

INDUCTOL
Fast-baking core oils

LIN-O-SET
Air-setting core binders

ADMIREZ
Foundry Resins

ADCOSIL
CO_2 Binders

FEDERAL
Core Washes

FEDERAL
Plumbagos

FEDERAL
Core Pastes

ROCKET-BAKE
Super-speed Liquid Core Binder

LIN-O-CEL
Sand Stabilizer

FREFLO
Parting Compound

Archer-Daniels-Midland company

FEDERAL FOUNDRY SUPPLY DIVISION

2191 West 110th Street • Cleveland 2, Ohio

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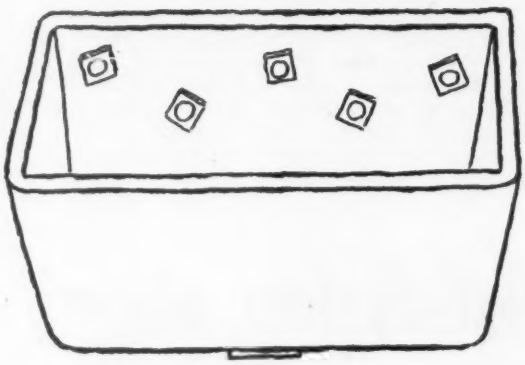


ALUMINUM

ALLOY CONVEYOR BUCKETS

1—LIGHT WEIGHT—LONG WEARING

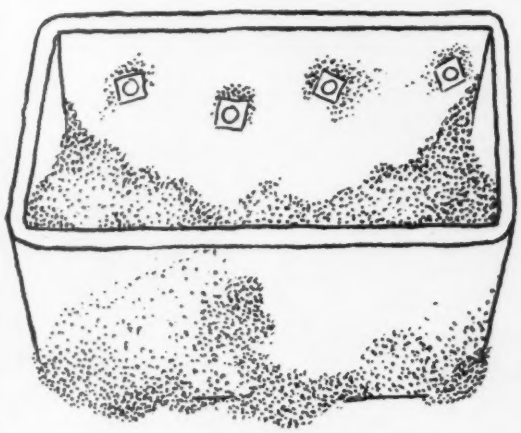
Our aluminum buckets, weighing only 40% of other types, produce greater payloads with less horsepower. Foundry engineers report no replacement due to wear. One user states "After years of service, the only noticeable wear on the buckets is along the nipping edge, and it is very slight after 4 years of use."

2—SELF CLEANING PROPERTIES—NO CORROSION

The longer aluminum buckets are in operation, the cleaner they empty. Surfaces age harden becoming smooth and glazed—therefore, materials don't stick.

3—LOWER MAINTENANCE COST

Rods, gaggers or even small castings falling in conveyors normally cause breakdowns and lost production. Belts tear apart or buckets pull off their bolts, jamming the system. Breakdowns are minor when Woodland buckets are used as usually only sections break out without tearing the belt. Complete belt changes require far less time and effort due to the lighter weight of the buckets and the comparative ease of hoisting the belt to the top pulley. *Maintenance men prefer aluminum buckets.*



SEE working installation on the new "HANDY SANDY" unit of the Newaygo Engineering Exhibit, Booths 1642-1644 and 1741-1743.

WOODLAND FOUNDRY CO., Inc.

Woodland, Wisconsin

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Circle 558 on Page 51→

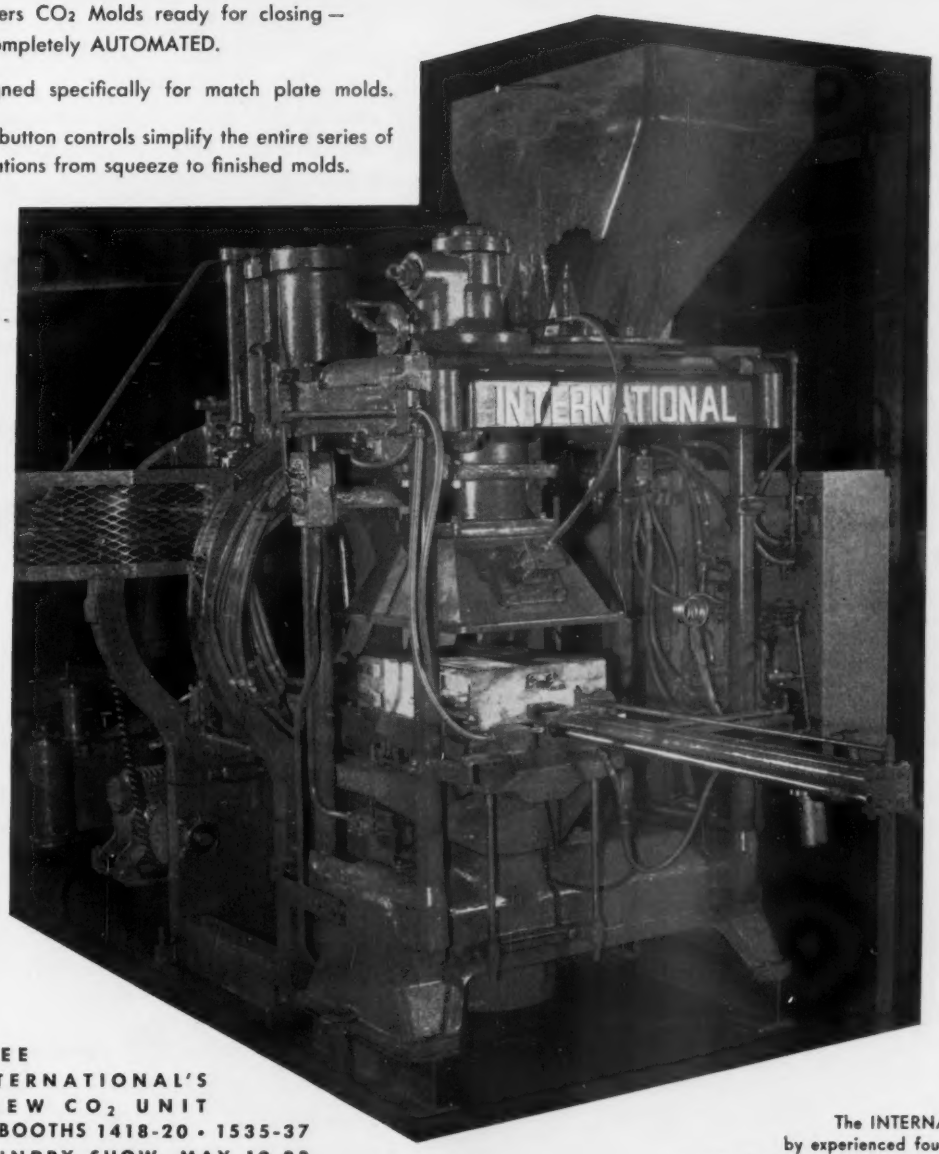
INTERNATIONAL

PRESENTS ITS NEW CO_2 UNIT

Delivers CO_2 Molds ready for closing — completely AUTOMATED.

Designed specifically for match plate molds.

Push button controls simplify the entire series of operations from squeeze to finished molds.



WRITE, TELLING US YOUR PARTICULAR NEEDS WE WILL FORWARD COMPLETE INFORMATION AND SUGGESTIONS

SEE INTERNATIONAL'S NEW CO_2 UNIT AT BOOTHS 1418-20 • 1535-37 FOUNDRY SHOW, MAY 19-23 CLEVELAND, OHIO

The INTERNATIONAL LINE is designed by experienced foundry engineers who have a practical working knowledge of the problems of the industry.

INTERNATIONAL

MOLDING MACHINE COMPANY

LAGRANGE PARK, ILLINOIS

YOU'LL DO A BETTER JOB

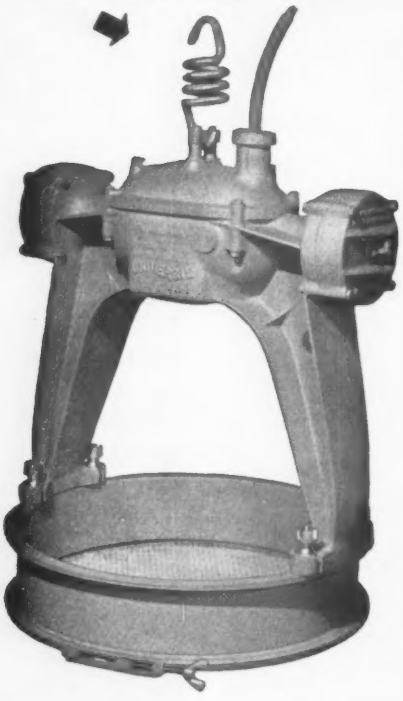
with **H. V. ADAMS DESIGNED**

HIGH EFFICIENCY FOUNDRY TOOLS

"UNIVERSAL FREE WHEELING"

FOUNDRY SAND RIDDLE

with the Double Eight Vibration

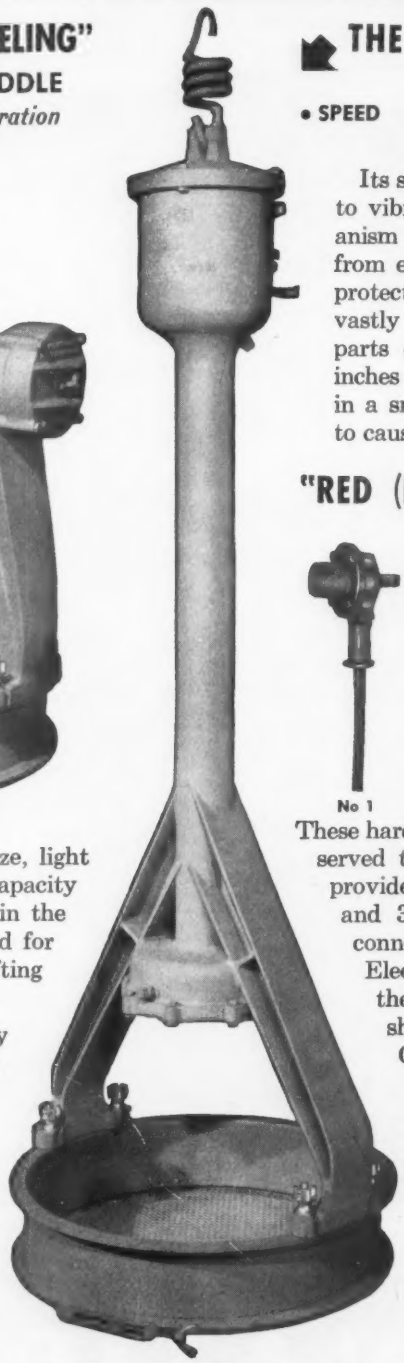


Because of its convenient size, light weight and good riddling capacity it long has been a favorite in the foundry. It also can be used for mixing core sand or for sifting sand directly into molds.

The mechanism is entirely enclosed protecting it from harmful dust and grit.

The main frame is cast in very strong tough aluminum.

It uses quick change ferruled sieves with 20 in. diameter sifting area. There are no loose wires to harm hands.



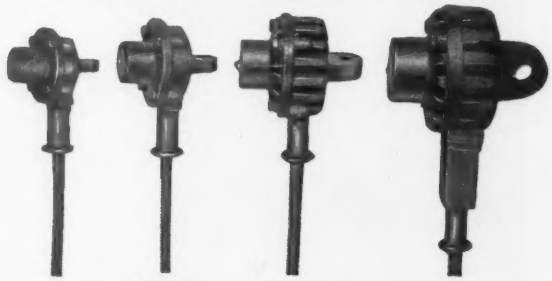
THE "ROTOPLANE" SPEED SIFTER

WILL GIVE YOU

- **SPEED**
- **ECONOMY**
- **SAFETY**
- **LONGER LIFE**
- **GREATER SIFTING CAPACITY**

Its sturdy one-piece frame and long shaft add to vibration effectiveness. The sealed-in mechanism assures protection of motor and bearings from exposure to dust and grit. This sealed in protection and "Rotoplane's" free-rotary action vastly increase bearing life. No exposed moving parts endanger the operator. Sieves have 20 inches diameter clear sifting area — are mounted in a smooth steel ferrule with no jagged edges to cause dangerous cuts and scratches.

"RED (Devil) ELECTRIC" VIBRATORS



No 1 No. 2 No. 5 No. 9

These hard hitting Adams designed Vibrators have served the foundries for over 30 years. They are provided with a 6 foot 3 wire authorized cable and 3 wire grounded connector which, when connected with our 3 wire grounded Red Electric Knee Switch, automatically grounds the vibrator protecting the worker from shock. The vibrators have passed the U. S. Government code inspection.

Other Foundry Products:

- **No. 11 NOISELESS TYPE VIBRATOR**
- **A-20 ELECTRIC VIBRATOR**
- **RED ELECTRIC KNEE SWITCHES**
- **"ROTO" ADJUSTABLE BIN VIBRATOR**
- **2 MIN. UNIVERSAL FINENESS TEST SIFTER.**
- **UNIVERSAL TRIPOD CARRIER**

ORDER ALL SIFTERS AND VIBRATORS WITH GROUND WIRE!!

FOUNDRY SUPPLIES MANUFACTURING CO., NOT INC.

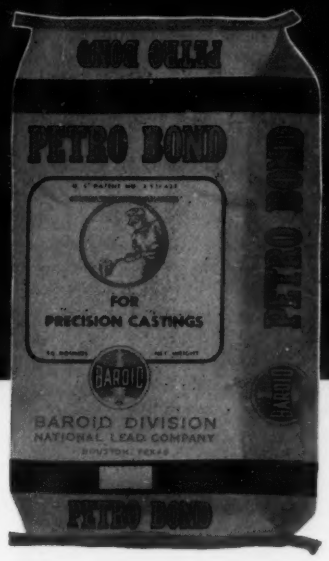
2221 Orchard Street - Chicago 14, Illinois

Established 1918 **Cable Address: "Rotoplane Chicago"** **H. V. ADAMS, Mgr.**

new from . . . BAROID

PETRO BOND

Bonds Sand WITHOUT Water



for . . . Precision Casting with Conventional Foundry Equipment

PETRO BOND* by BAROID is a formulated bonding agent that bonds sand with the use of *oil* instead of *water*. The PETRO BOND sand contains oil in place of water . . . needs much less venting . . . permitting use of much finer sands with lower permeability than allowable with water sand molds. This means *precision castings* . . . using all ordinary foundry equipment.

Fifteen times less gas is generated in a PETRO BOND sand mold than in water bonded sand and less oil is used in PETRO BOND sand than water in conventional green sand mixes.

Foundries using PETRO BOND in both heap and complete sand systems have all reported definitely superior castings with their standard equipment.

*Registered Trademark Baroid Division, National Lead Co.

Visit BAROID at Arena booth 414 at the AFS Castings Congress & Show, Cleveland, May 19-23.

BAROID DIVISION ● NATIONAL LEAD CO.
332 South Michigan Avenue, Chicago 4, Illinois

BAROID

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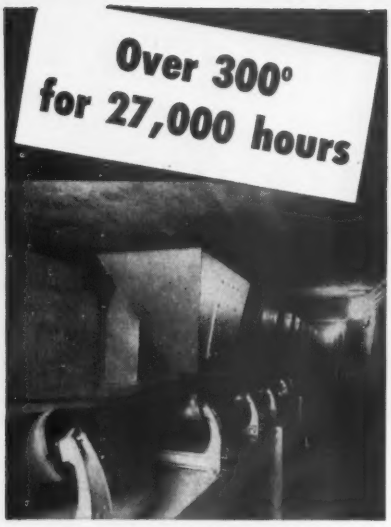
B 5654



Imperial Hot Belt still going strong after 27,000 hours

The shakeout conveyor belt pictured above (236′ of 24″ x 5 ply) has already handled over 200,000 tons of red hot sprues and 300° to 400° sand for Briggs Manufacturing Co. It is still in excellent condition!

Unusual? Not for Imperial* Insulated Sahara* Belting, job-designed for the destructive high-temperature conditions of foundry service.

Job-designed belting. Imperial Sahara Belts are protected against heat damage by asbestos insulation and special impregnating compounds. Double-stitched, INNERLOCKED* construction positively prevents plies from separating.

Other Imperial Sahara Belts are designed to handle temperatures to 600°. To find out which Imperial Belt best fits your requirements, send for new Belting Catalog and Engineering Handbook.

*Reg. Trademark of Imperial Belting Co.

Imperial
BELTING COMPANY
1755 S. Kilbourn Ave., Chicago 23, Ill.

You expect MORE from Imperial . . . and you get MORE!

Mail this coupon today for NEW Belting Catalog and Engineering Handbook

Name_____

Address_____

Circle 561 on Page 51

With the Editors

Foundrymen Help: Foundrymen and manufacturers of equipment have been most generous in supplying much of the information presented in the feature of this issue "Are you paying for equipment you do not have?" The editors appreciate the help greatly, and feel the contributions will be of interest and benefit to many in the industry.

—o—

Economy? A news release from the Pressed Metal Institute tells that Jack F. Greathouse, new development supervisor, Engine Division, Mack Trucks Inc., recently won the John Woodman Higgins Redesign Award for 1958 for a new engine manifold design. The release states: "The new manifold design is considered a significant advance in production of this important engine part. It involves a changeover from sand cast aluminum manifolds to a new design stamped in halves from sheet metal and then welded into a single unit.

"Among the many advantages of the stamped manifold, unique for smaller engines, are less bulk, nearly 12 lb less dead weight, greater ease of repair, improved accessibility, and lower cost."

If this manifold wears as well as tail pipes and mufflers on our automobiles, users will be glad to return to cast metals.

—o—

Much Effort: Announcement by our contemporary that a daily edition will be published for five days during the coming AFS convention and exhibition in Cleveland recalls that on four different occasions a daily edition of FOUNDRY was published for convention visitors.

From April 30 to May 3, 1923, a daily FOUNDRY was published in connection with the annual convention and exhibition of the American Foundrymen's Society in Cleveland. It was a 16-page, regular newspaper size paper which carried complete news of the convention and exhibition and daily lists of registrants.

An 8-page regular size newspaper was published Sept. 27-30, 1921 by FOUNDRY for the Detroit AFS convention. This was written in Detroit, printed by the Penton Press in Cleveland and shipped to Detroit each night.

Two years later the daily edition was repeated for the annual convention and exhibition in Philadelphia. Again the material was prepared at the convention, telephoned and telegraphed to Cleveland where the paper was printed, and then shipped to Philadelphia on the night train. A feature of that daily was our first use of telephoto. A photograph of dignitaries opening the convention was taken at 10:30 Monday morning, developed and rushed by train to New York, sent by telephoto to Cleveland, and appeared Tuesday morning.

Once more, in 1930 at Cleveland, the FOUNDRY daily appeared during five days of the AFS convention.

As we have found out through experience, it takes a lot of hard work on the part of many people.

—o—

On the Platform: What do editors do in their "spare" time? Many things. For example, Bill Gude,

(Photo by Harold Wheeler, Allyne-Ryan Foundry Co.)

managing editor, recently acted as technical chairman of an AFS chapter meeting and had the pleasure of introducing Walter Sicha (right), Aluminum Co. of America, who was the speaker. That was Walter's second platform appearance of the day; he was a panel member at an FEF meeting that morning.

—o—

No Time? Walter J. Campbell, editor of our sister publication, *Steel*, had an excellent editorial in the March 31 issue which I hope you will take to heart:

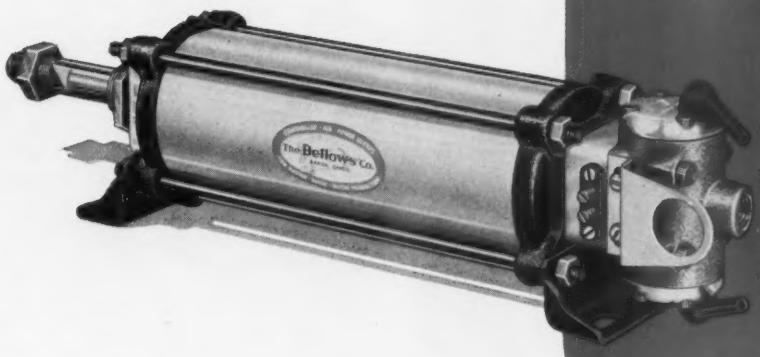
No Time To Read?

We have just read an excellent criticism of the American educational system. It contrasts the frivolities of U. S. teaching methods with the austerities of the Russian system. It warns that courageous action must be taken if we are to win the battle of future brainpower.

We agree. And we suspect we are joined in our opinion by most of our readers who have read or listened to scores of similar criticisms.

But we wonder if it isn't time to give

the ultimate in air cylinder power-



BUILT-IN ELECTRICALLY-CONTROLLED DIRECTIONAL VALVE

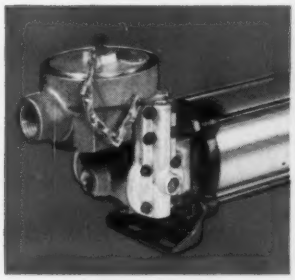
BUILT-IN DUAL SPEED CONTROLS

REQUIRES ONLY A SINGLE AIR CONNECTION

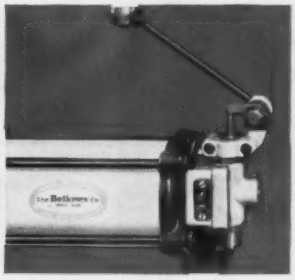
THE BELLOWS AIR MOTOR

The Bellows Air Motor is a complete air cylinder power unit, with directional valve and speed controls built-in. Takes less than half the space and costs less installed than a conventional air cylinder set-up of equal power with its separate valving and piping. The single air connection, which can be made with flexible hose, makes it ideal for use on moving machine elements. It is a sturdy unit with forged steel heads, heavy brass cylinder, stainless steel piston rod. The piston rod is threaded, equipped with a wrench flat and nut. Many Bellows Air Motors have been operating day in and day out for fifteen years with negligible maintenance. And if service needs do arise, there is a Bellows Field engineer as near as your phone. The Bellows Air Motor shown above is a 2½" bore unit equipped with the Bellows Low-Voltage (8-12V) Electroaire Valve. Other bores available are 1¼", 1¾", 3⅝" and 4½". Any stroke length. Optional choice of built-in valves as shown below.

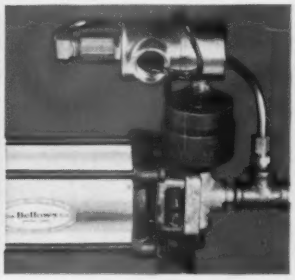
CHOICE OF BUILT-IN VALVES



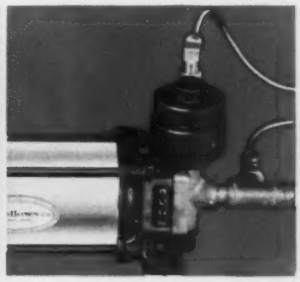
115 V. ELECTROAIRE VALVE
For J.I.C. applications where a 115 v. momentary contact is desirable.



MECHANICAL VALVE
For manual operation or for use with cams or direct linkage.



115 V. MAINTAINED CONTACT
Valve remains in shifted position during period current is applied.



AIR-OPERATED
For use in applications calling for full pneumatic control.

Write for these two booklets

Fifty pages of data to help you select the right Air Motor-Valve combination for your job. Address Dept. FO558, The Bellows Co., Akron 9, Ohio. In Canada: Bellows Pneumatic Devices of Canada, Ltd., Toronto 18. Ask for Bulletins BM-25 and SP-55.

The Bellows Co.

DIVISION INTERNATIONAL BASIC ECONOMY CORPORATION

AKRON 9, OHIO

983-B

Circle 562 on Page 51

Foundry Proved for Maximum Efficiency!

HAUSFELD TILTING CRUCIBLE FURNACES

- trouble-free tilt . . . *holds* in any position
- heavy duty cast iron trunnions surrounded by roller bearings
- precision-machined throughout
- arrives factory-assembled, factory-tested to operating temperature
- exclusive Hausfeld swing-top compensates for various size top covers

With crucible sizes from #40 to #400, there is a Hausfeld Tilting Furnace to help you boost your plant's efficiency. Write for full details today.
THE CAMPBELL-HAUSFELD CO.,
300 Moore St., Harrison, Ohio

See Hausfeld equipment at the American Foundrymen's Convention, Cleveland . . . BOOTH 1658.

CAMPBELL-HAUSFELD
METAL MELTING FURNACES

the upcoming generations a respite and turn a critical eye on the quality of the information possessed by the present generation—the one that is running our country and our industry. Its lease on the driver's seat still has many years to run.

We realize that most adults would have a tough time keeping abreast of all the technological developments of this age. Many become obsolete even before the specialists have time to read the literature on them.

But what about our own fields?

Do we know what productive equipment will give us the lowest possible unit costs?

Do we really understand our marketing problem? Do we know why buyers of industrial goods buy what they buy? Do we know who really influences such purchases? Do we comprehend the modern marketing function and organization?

Is our purchasing function simply one of buying established products under the most favorable conditions we can obtain? Do our buyers really know how to find equal or better values at lower cost? Do we actually know when it is smarter to make than buy and vice versa?

Are we conversant with the new management techniques? Do our organizations reflect them?

If we have to answer any of those questions in the negative, we have a problem.

Time and time again we have heard industrial executives explain: "I don't have time to read all the stuff I should." We sympathize. Quite honestly, we feel that way, too.

But until we fully understand the problems in our own fields, the "no time to read" excuse is just as flimsy as those made for the laxity in our school system. We can hardly criticize our undergraduate educational system until we have put our own information in order.

Selective reading is the quickest and most effective answer. The information is available. Selectivity is the key.

You don't have time to read?

You can't afford not to.

—o—

Calendar: Since the February, 1955, issue, we have published the "Calendar of Meetings" on page 14. Now, because of a mechanical problem, it is necessary to move this department to page 16.

So look for it there and find the listings of the important national and regional meetings of associations and societies serving the foundry industry.

—o—

The Show: FOUNDRY will have a booth in the Lakeside Hall at the Cleveland AFS Foundry Show. All members of the editorial and business staffs will be on hand. Drop in for a rest and visit, and inspect the many reprints of important articles which have appeared in FOUNDRY during the past year.

F. G. S.

Circle 563 on Page 51

This idea was perfected by Wheelabrator® pioneering

Just twenty-five years ago, a wheel first became a "Wheel-abrator". Mankind's greatest invention . . . the wheel . . . was turned to a new purpose. A new idea gave industry a better way to blast clean materials — without air.

Wheelabrator's policy of pioneering leadership perfected this process. And with it was born an entirely new industry of which Wheelabrator Corporation is the principal supplier and the leading contributor to its advancement.

The same pioneering philosophy led Wheelabrator to adapt this revolutionary process to a multitude of new and unique uses. And the list of applications continues to grow as Wheelabrator's research probes and explores to find better ways to solve industry's blast cleaning and finishing problems.

WHEELABRATOR
CORPORATION

505 South Byrkit Street Mishawaka, Indiana

Canadian Offices: Scarborough (Toronto) – Montreal

50
YEARS OF PROGRESS
WHERE PIONEERING LEADERSHIP INSURES PERFORMANCE

World's largest manufacturers of airless blast equipment and steel abrasives.

Circle 564 on Page 51

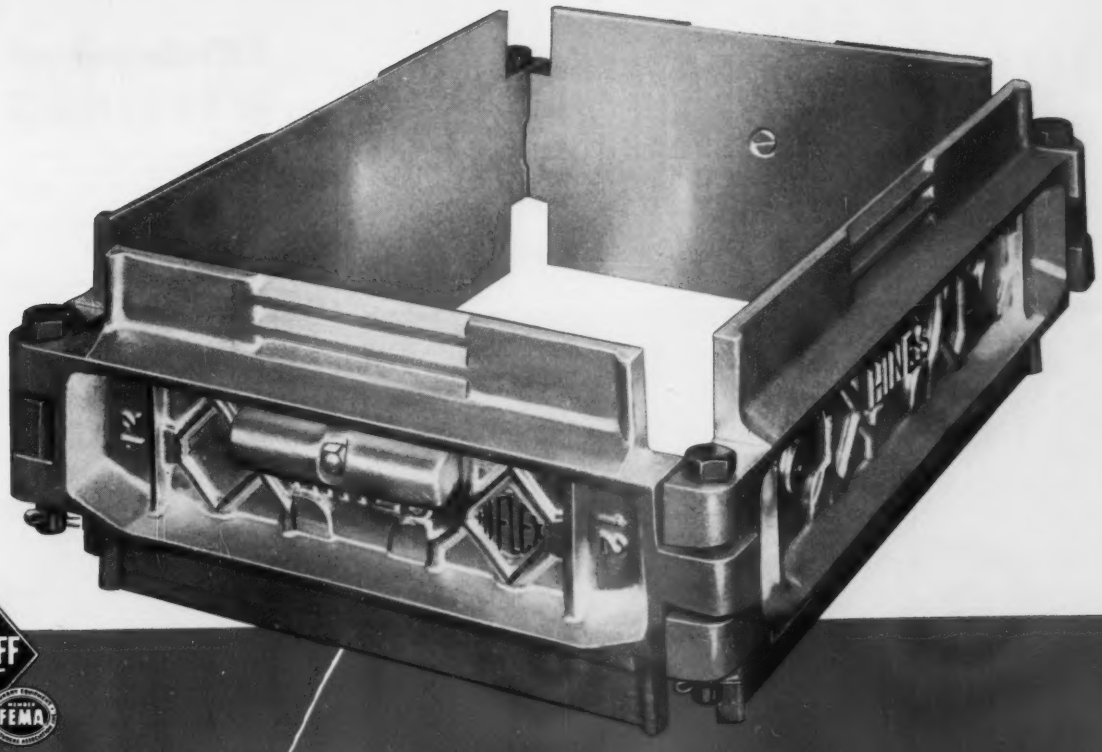
HINES

HI-FLEX*

CAST JACKETS

another
new HINES advancement in molding equipment for better, more economical foundry production

*TRADE MARK



HINES POP-OFF FLASK

MEMBER FEMA

Now, from HINES, comes a *truly flexible*, cast jacket — the HI-FLEX*.

This remarkable new jacket, upon application to the mold, instantly and accurately assumes the exact shape of the mold and automatically adjusts itself to the mold taper.

In addition, the fit on the mold, in relationship to the parting line, can easily be changed by replacing the corner pins with pins of larger or smaller diameter. This feature also permits adjusting the HI-FLEX* jacket to fit either slip or POP-OFF molds.

HI-FLEX* jackets are cast of aluminum and iron, in all sizes. They are jig and fixture built to insure maximum accuracy (as are all HINES flasks and jackets). End and side castings may be purchased separately and corner pins are available in a variety of diameters, for changing the fit on the mold. Additional optional equipment — filleted corner inserts and steel corner protection shields.

SEE THE HI-FLEX* AT THE FOUNDRY SHOW . . . BOOTH 606

The HINES FLASK *Co.*

3431 WEST 140th STREET • CLEVELAND 11, OHIO

Circle 565 on Page 51

WHY PAY MORE

when you can buy the best binder at the lowest price!

INSIST ON STEINEX

the original CO_2 Binder available only from Carver

BEST QUALITY Steinex gives you absolutely the best shakeout — BY FAR!

BEST PRICE Steinex is 30% lower in cost than any other binder on the market!

BEST SERVICE Carver has the in-the-foundry experience and know-how to help you use Steinex in your CO_2 operation — successfully and profitably!

JOIN THE HUNDREDS OF FOUNDRIES THAT INSIST ON THE BEST

MAIL TODAY

CARVER FOUNDRY PRODUCTS CO.
Muscatine, Iowa

RUSH information and prices on Steinex binders.

NAME _____ TITLE _____

FOUNDRY _____

CITY _____ STATE _____

Calendar of MEETINGS

May 5-6—American Institute of Mining, Metallurgical & Petroleum Engineers, conference on properties of high-strength steels, Penn-Sheraton Hotel, Pittsburgh.

May 8-9 — Magnesium Association, annual closed meeting, Grove Park Inn, Ashville, N. C.

May 8-9—Refractories Institute, annual meeting, Homestead, Hot Springs, Va.

May 8-10—American Material Handling Society, western regional material handling show, Great Western Exhibit Center, Los Angeles.

May 12-16—American Society for Metals, 1st southwestern metal congress and exposition, Automobile Bldg., Dallas, Tex.

May 14-16—Society for Experimental Stress Analysis, spring meeting, Manger Hotel, Cleveland.

May 19-20—Non-Ferrous Founders' Society, annual meeting, Carter Hotel, Cleveland.

May 19-23—American Foundrymen's Society, 62nd annual convention and exhibition, Public Auditorium, Cleveland.

June 9-10—Malleable Founders' Society, annual meeting, Homestead, Hot Springs, Va.

June 9-12—National Materials Handling Exposition, Public Auditorium, Cleveland.

June 12-13 — American Foundrymen's Society, annual chapter officers conference, Hotel Sherman, Chicago.

June 19-21—American Foundrymen's Society, foundry instructors seminar, Case Institute of Technology, Cleveland.

June 22-27—American Society for Testing Materials, annual meeting, Statler Hilton and Sheraton-Plaza Hotels, Boston, Mass.

June 23-25 — Investment Casting Institute, spring meeting, Occidental Hotel, Muskegon, Mich.

Sept. 10-11—American Die Casting Institute, annual meeting, Edgewater Beach Hotel, Chicago.

Sept. 15-19—Instrument Society of America, annual instrument - automation conference and exhibit, Convention Hall, Philadelphia.

Sept. 22-23—Steel Founders' Society of America, fall meeting, Homestead, Hot Springs, Va.

Oct. 8-10—Gray Iron Founders' Society, annual meeting, Sheraton Park Hotel, Washington.

Oct. 13-15—American Gas Association, annual convention, Convention Hall, Atlantic City, N. J.

Oct. 15-16—Michigan Regional Foundry Conference, University of Michigan, Ann Arbor, Mich.

Oct. 16-17—All-Canadian Foundry Conference, Royal Connaught Hotel, Hamilton, Ont.

Oct. 16-18—Foundry Equipment Manufacturers Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 17-18—New England Regional Foundry Conference, Massachusetts Institute of Technology, Cambridge, Mass.

Oct. 18-21—Conveyor Equipment Manufacturers Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 27-30—Metallurgical Society of AIME, fall meeting, Cleveland.

Oct. 27-31—American Society for Metals, national metals exposition and congress, Public Auditorium, Cleveland.

Oct. 30-31—Metals Casting Conference, Purdue University, Lafayette, Ind.

Oct. 31-Nov. 1—Northwest Regional Foundry Conference, Multnomah Hotel, Portland, Oreg.

Nov. 10-12—Steel Founders' Society of America, technical and operating conference, Carter Hotel, Cleveland.

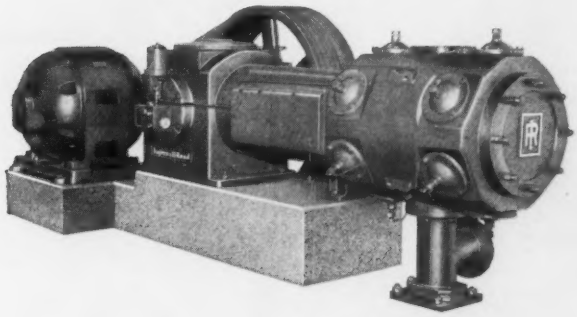
Nov. 20-21—National Foundry Association, annual meeting, Drake Hotel, Chicago.

Dec. 3-5—American Institute of Mining, Metallurgical, & Petroleum Engineers, Electric Furnace Steel Conference, Detroit.

NEW COMPRESSORS

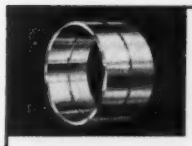
...with heavy-duty features proven in larger Ingersoll-Rand compressors

ESH* (horizontal)



ESV* (vertical)

*The same compressor in either horizontal or vertical arrangement – 20 to 150 hp sizes, single-and multi-stage, pressures up to 5000 psi and vacuums.



Full-floating aluminum bearings never need adjustment

The full-floating bearings "roll with the punch," taking each thrust on a different portion of the shell. They are foolproof, and never require fitting or adjustment. Main and crankpin bearings are made of I-R's special aluminum bearing alloy, which has higher load capacity and better heat conductivity than other bearing materials.

Air-cushioned Channel Valves give unmatched performance

Known the world over for lasting efficiency, dependability and quiet operation, Ingersoll-Rand air-cushioned Type A Channel Valves are entirely different in design and principle from any other valves in use. Type A Channel Valves were developed especially for modern compressor speeds, and feature a separate stainless-steel seat plate which can be reversed or replaced for new life.

Never a need for adjustments– frame is kept sealed!

Here's an entirely new line of compressors, built to run longer — much longer. They're more compact, more efficient, and require less attendance, less maintenance. They offer greater capacity in less space, and are ruggedly built and highly refined to take years of continuous hard service.

All running parts are precision-machined and need no fitting or adjusting, so the frame is sealed — dirt stays out, and the major causes of wear are eliminated!

There are many design features—including filtered force-feed lubrication and full-floating self-adjusting metallic packing — that have heretofore been found only in larger Ingersoll-Rand compressors. Let your I-R representative tell you more about these new compressors, and how they can save you money.

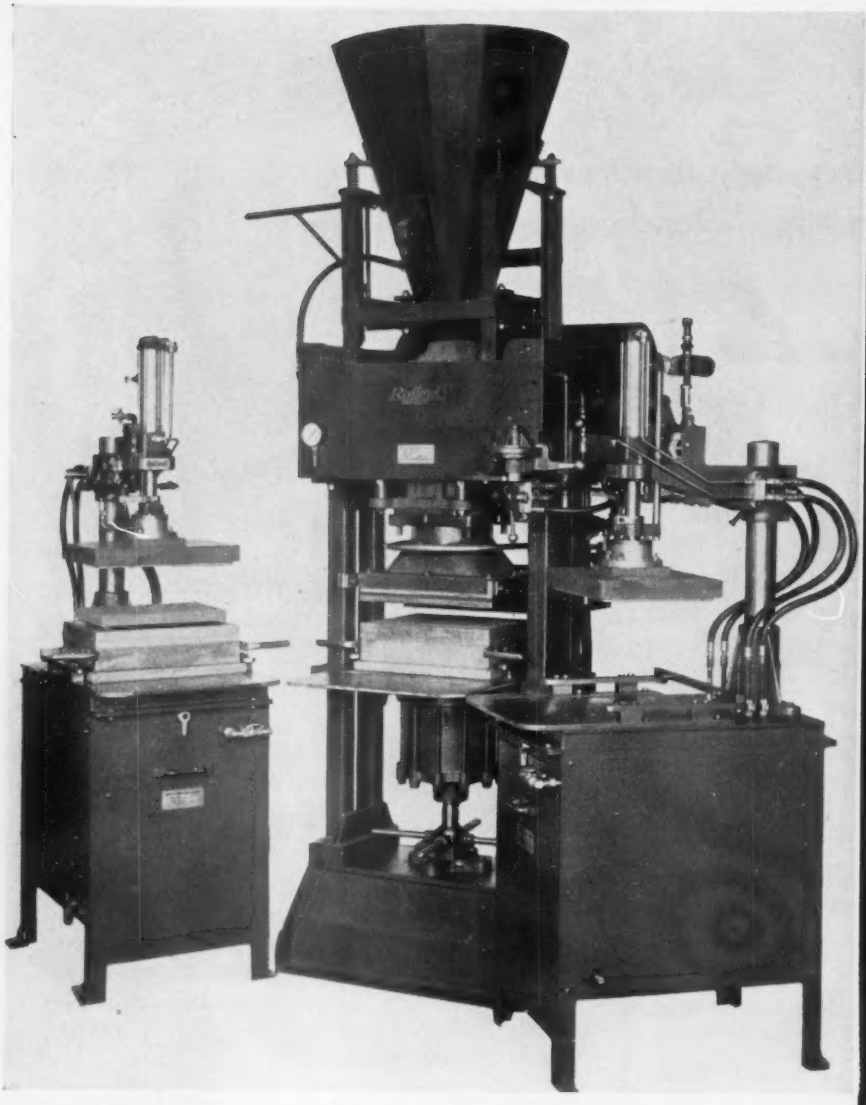
Ingersoll-Rand

I-815

11 Broadway, New York 4, N. Y.

In engineered products, there's no substitute for experience!

COMPRESSORS • GAS & DIESEL ENGINES • PUMPS • AIR & ELECTRIC TOOLS • CONDENSERS • VACUUM EQUIPMENT • ROCK DRILLS



REDFORD CO_2 MOLD MAKING EQUIPMENT

Here is a proven way of applying the CO_2 process to the production of small castings. With the above Redford #420-D Core Blower and (2) Model H-2-M Gassing Stations, one mold is being blown and squeezed while another one is automatically gassed and stripped. Up to 80 complete molds (cope and drag) are produced in one hour. Molds are flat and can be stacked for pouring. Metal yield is greatly increased. Very little floor space is required. Millions of small parts have been cast to close tolerances at reduced costs. For complete information write for BULLETIN No. 421.

Visit our Booth #1722 at the Foundry Show.

Redford IRON & EQUIPMENT CO.
20733 Glendale • Detroit 23, Michigan
Phone: KEnwood 1-8611

TYPICAL CO_2 MOLD CASTINGS

½ Actual Size

Circle 568 on Page 51

Circle 569 on Page 51→

NOW! A PORTABLE PNEUMATIC CONVEYOR

(needs no Pit)

MODEL 50. Five cubic feet capacity transporter with loader in raised position.

VISIT BOOTH Nos. 1648 and 1747 American Foundry Convention CLEVELAND May 19-23

Automatically TRANSPORTS FOUNDRY SANDS *Faster... at low cost*

- EASY TO INSTALL
- LOW ORIGINAL COST
- LOW MAINTENANCE

CUTS MATERIAL HANDLING COSTS for small Foundries

Even a small foundry can increase production and save costly man hours with WHIRL-AIR FLOW Pneumatic Conveyor System. This system transports all types of foundry and core room sands, mixes and other dry granular materials.

The portable WHIRL-AIR FLOW System, illustrated, can be moved into your plant as a complete unit, ready for operation, with no major engineering or structural changes needed.

WHIRL-AIR FLOW delivers sand mixes which are well aerated and fluffed, without moisture loss. A spiral air flow is maintained directionally throughout the pipe line for efficient material handling and reduction of abrasive wear on seamless tubing.

The Transporter, loaded from the source, sends sand under air pressure in a smooth, whirling flow into the pipe line. Booster Fittings at proper intervals on the line maintain the directional spiral and hold sand in suspension. Transfer switches and line flexibility permit delivery of material to any location. A dust-tight cabinet houses the push-button control equipment. Special design insures low wear and long life of the Receivers, as well as all other equipment. Addition of Transfer Switches and Receivers, as needed, provides for plant expansion.

LOADING TRANSPORTER FROM MULLER

Showing loader lowered in loading position receiving from Muller. When filled, loader is raised over transporter and dumped as seen in upper photo.

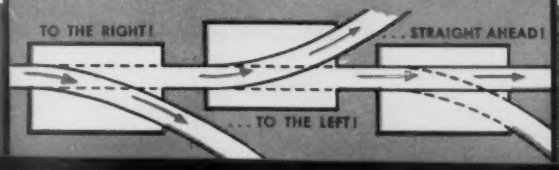
TRANSPORTER is sealed after loading. Three inlet manifolds admit air into the chamber through removable jets which distribute the air in a downward directional spiral carrying material in a smooth whirling flow from the outlet cone into the pipe line.

TRANSFER SWITCHES and pipe line flexibility permit delivery of material to any location. Work stations and storage can be located where desirable. Each transfer switch provides two-way distribution as illustrated below. Add switches to serve additional stations as foundry grows. These Whirl-Air-Flow switches are simple, practical design. Special reinforced rubber tubing and rugged construction assure long maintenance-free operation.

TRANSPORTER SIZES

MODEL 50	5 Cu. Ft.
MODEL 90	9 Cu. Ft.
MODEL 180	18 Cu. Ft.

WRITE TODAY for additional information on how the WHIRL-AIR-FLOW System can save dollars in *your* plant, or call for representative.



WHIRL-AIR FLOW CORP.

WHIRL-AIR-FLOW CORP.

FEderal 9-0231

650 25th Avenue S. E., Minneapolis 14, Minnesota

The identical top

...when you reorder the same K Bond† wheels... ideal for snagging cast iron, malleable iron and non-ferrous metals... bring you exactly the same "Touch of Gold" benefits

The Norton K Bond is one of the most outstanding vitrified bonds ever developed. That's why CRYSTOLON* wheels bonded with it outlast and outperform all others used for heavy duty, slow speed snagging of cast iron, malleable iron and non-ferrous metals.

One reason is, the K Bond provides:

- ***Closest possible duplication of wheel specifications***

NORTON
ABRASIVES
Making better products... to make your products better

performance...every time

Plenty of foundry reports prove that this outstanding structural advantage produces valuable operating advantages whenever K Bond CRYSTOLON wheel specifications are reordered. For example:

- *Faster, freer cutting action*
- *Much longer wheel life*
- *Less frequent dressing*
- *Corners held better*

Get proof in your own plant

of how these revolutionary wheels add the profit-boosting "Touch of Gold", snag off more metal per dollar and cut cleaning room costs — on equipment ranging from heaviest floor stands to lightest portables. Your Norton Distributor will gladly arrange the toughest possible workout tests in your foundry. Or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

W-1852

NORTON PRODUCTS
Abrasives • Grinding Wheels • Grinding Machines
Refractories • Electrochemicals

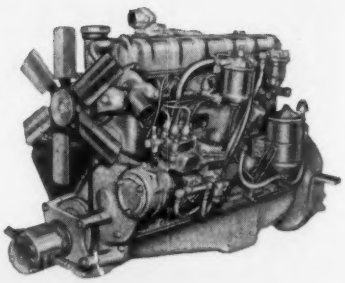
BEHR-MANNING DIVISION
Coated Abrasives • Sharpening Stones
Pressure-Sensitive Tapes

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries
†Patent applied for

Circle 570 on Page 51

ALLIS-CHALMERS YEARS-AHEAD DESIGN WITH

DO MORE POWER



"The proved and dependable Allis-Chalmers engine, combined with design features, makes this an outstanding industrial truck," says a spokesman for a large northern foundry using a fleet of Allis-Chalmers lift trucks.

. . . gives you "Do-More" lift truck performance

It takes a heavy-duty *industrial* engine — one that develops tough "hang-on" torque — to do a really good job in a fork truck. Allis-Chalmers *Do-More* engines have it!

That's why the Allis-Chalmers fork truck engine is unique in the industry today. It is a real heavy-duty engine with high, yet comparatively even torque . . . one that delivers the most power at normal working speeds. Under your operating conditions you'll find that *Do-More Power* does more work — and lasts longer.

This *Do-More Power*, plus many years-ahead truck features, gives you the "Do-More" lift truck performance you want. Send for literature or ask your Allis-Chalmers material handling dealer for a demonstration.

Allis-Chalmers, Engine - Material Handling Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

BH-65C

Miss Liquidizer advises: Weight Reducing Is Not Without A Plan!

Photo by H. Armstrong Roberts

Soffel's
CARBON FREE LIQUIDIZER

ENABLES YOU TO DRASTICALLY REDUCE THE SIZE OF YOUR FEEDING HEADS

Your plan for increased yield will be effective when you use SOFFEL'S Carbon-Free Liquidizers. Our Carbon-Free Liquidizers for iron, steel, nodular iron, and non-ferrous alloys assure more sound shrink-free castings from each ladle of metal poured.

Contact your PMP Co. *Distributors for a demonstration.*

During the Convention Visit Parlor L, Hotel Statler!

PITTSBURGH METALS PURIFYING CO., Inc.

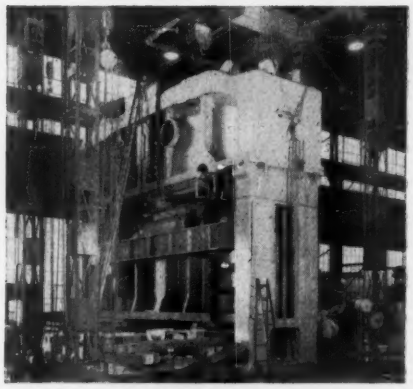
Mars, Pennsylvania • Phone: National 5-5800

"WORLD'S LARGEST MANUFACTURER OF FLUXES, PURIFIERS AND EXOTHERMIC COMPOUNDS FOR ALL METALS AND ALLOYS"

(Advertisement)

THERE'S A BETTER WAY . . .

"Task Force Tactics" Save Money on Tough Machinery Installations



TWO 100-TON "A" FRAMES. (CCC built) were needed to position the crown of this big Hamilton press.

YES, there's a way to make and save money when having machinery installed. First, be sure the job is handled by a professional installer. Then make certain that your professional working partner is fast, accurate and responsible.

When stubborn problems develop on a big industrial installation, only a miracle can get the project back on schedule. Commercial Contracting Corporation, a leading U. S. installer based at Detroit, has an effective solution. A task force of specialists is assigned to cover each phase of an installation. Each unit is a self-sufficient team capable of completing the job without additional help. A twin-engine airplane whisks key operating personnel from job to job. Mobile telephones link home office and project activities.

A Commercial Contracting Corporation spokesman says "The task force approach is the only positive method we have of tying together the hundreds of details in the installation of complicated machinery. Delays boost the price of the equipment. By maintaining or beating schedules, we make money for our customers."

This technique was born of necessity to keep pace with postwar industrial expansion. Yesterday's makeshift methods could not meet the challenge. Task force tactics do, and industrial installations have become a big and specialized business.

CCC's reputation, gained through the installation of seven of the 10 major automotive press plants built since 1947, now reaches into the steel, aluminum and other basic metals industries. The company, trained in serving the auto industry, applies its task force techniques to major installations of automation machinery, rolling mills, foundries, press plants and other types of manufacturing equipment.

That's why leading users agree that installing industrial machinery and equipment is not a do-it-yourself project. There's a better, faster and more economical way.

CCC's 16-page illustrated brochure, "Industrial Installations," explains these services more fully. To obtain a copy or help on your own problems, address your request to Commercial Contracting Corporation, 12160 Cloverdale, Dept. 1-F Detroit 4, Michigan.

A TYPICAL CCC "TASK FORCE" UNIT headed by J. C. McLure, *Project Coordinator*. On his left E. C. Sawyer, *Estimating Engineer*, U. A. Strang, *Director-Purchasing* and C. M. Wasson, *Company Pilot*. On Mr. McLure's right C. J. Duke, *Superintendent-Operations*. Q. C. Clark, *General Superintendent* and his *Assistant Superintendents* L. A. Watson and F. Cangemi.

Lasts Longer!

Cuts Faster, too with NEW IL BOND

SIMONDS ABRASIVE CO.

SNAGGING WHEELS

WITH REINFORCING FLANGES

For your toughest jobs, new IL Bond gives these wheels this ideal combination: *the fast free cutting of a soft grade with the "head-in" productive bite and long life of a hard grade.* Write for Bulletin ESA 62.

SIMONDS ABRASIVE COMPANY

Tacony & Fraley Sts., Philadelphia 37, Pa.

Division of Simonds Saw and Steel Co.

BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA
PORTLAND, ORE. • SAN FRANCISCO • SHREVEPORT

Circle 574 on Page 51

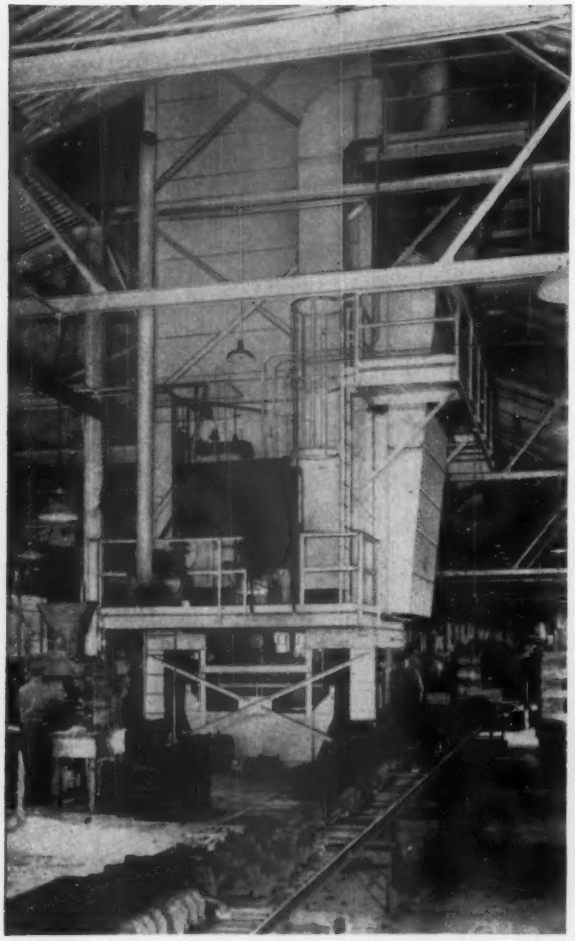
CALL
YOUR SIMONDS DISTRIBUTOR

Proven products
Dependable know-how
Quick supply

COLEMAN

lead to

and



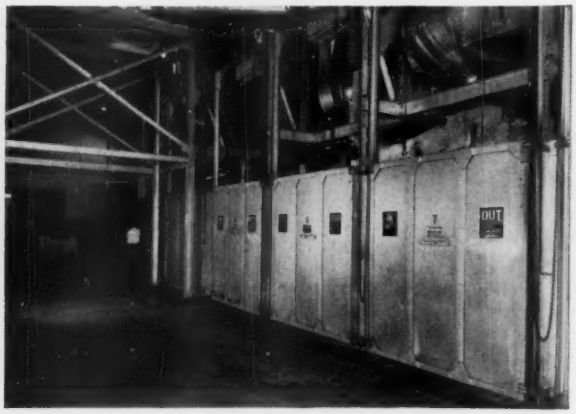
Coleman Tower® Oven

Your out-dated core and mold ovens may be costing you thousands of dollars . . . because they cannot provide the production savings you can realize from modern, efficient Coleman Ovens.

The exclusive advantages of Coleman Ovens are reflected in instant improvement in cores, molds and casting quality. In many installations the immediate reduction of scrap losses . . . and substantial savings in fuel, material and labor have enabled users to pay for a new Coleman Oven in less than a year.

Since production savings are so vital to your profits . . . isn't it worth your time now to investigate the advantages of Coleman Ovens. Our experienced engineers are available without obligation to give practical suggestions for your particular requirements.

WRITE FOR BULLETIN 54

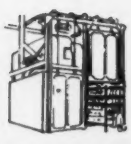


Coleman Transrack Ovens

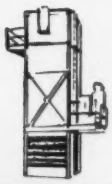
Let us recommend the RIGHT type of core or mold oven for your requirements — we make them ALL!

COLEMAN PORTABLE CORE OVENS

COLEMAN ROLLING DRAWER CORE OVENS



COLEMAN TRANSRACK CORE OVENS



COLEMAN TOWER CORE OVENS

OVENS

production savings

greater profits

Coleman Dielectric Oven

Only COLEMAN offers a complete line of foundry ovens with all these advantages

RECIRCULATING HEATING OR DIELECTRIC SYSTEMS to meet your requirement best.

DEPENDABLE BAKING AND DRYING. Coleman Ovens remove all uncertainties in core baking and mold drying. Rejects and make-overs are eliminated.

INCREASED LABOR SAVING. Efficient and modern mechanical designs reduce handling and other indirect labor to a minimum.

HEAVY DUTY CONSTRUCTION. Responsible for dependable performance, economical operation, and minimum maintenance cost under rugged service requirements.

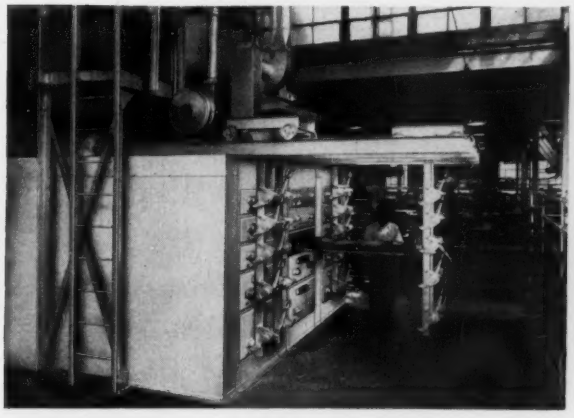
MAXIMUM FUEL ECONOMY. Coleman Heating Systems use the most economical fuel available to you — gas, oil, stoker-coal, electricity, etc.

FLEXIBILITY AND ACCURATE CONTROL to bake oil or resin binders — whichever is most satisfactory for your requirements.

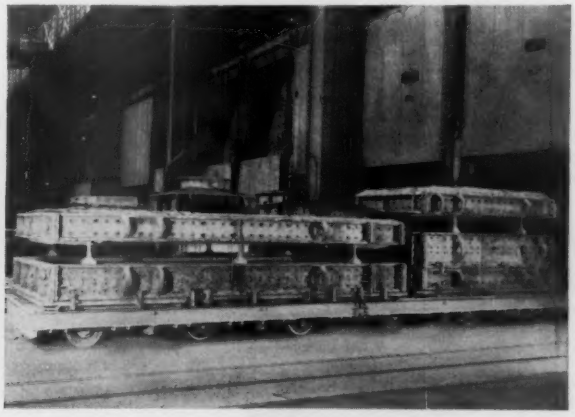
BETTER WORKING CONDITIONS. Positive ventilation built into Coleman Ovens prevents leakage of fumes and gases — helps to make the core department a good place to work.

ADVANCED OVEN "KNOW-HOW". Coleman Engineers have pioneered and developed the most efficient oven designs to meet the highly specialized needs of modern foundry methods in all classes of work.

WIDEST EXPERIENCE. Gained through more than half a century of specialization in foundry ovens and the building of over 11,000 successful Coleman Oven installations.



Coleman Rolling Drawer Ovens

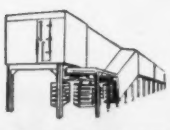


Coleman Car Type Mold Ovens

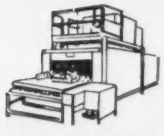
THE FOUNDRY EQUIPMENT COMPANY

1821 COLUMBUS ROAD **CLEVELAND 13, OHIO**

World's Oldest and Largest Foundry Oven Specialists



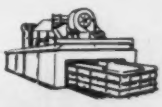
COLEMAN HORIZONTAL CONVEYOR CORE OVENS



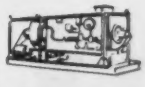
COLEMAN CONVEYOR REDRY OVENS

COLEMAN DIELECTRIC CORE OVENS

COLEMAN CAR-TYPE OVENS



COLEMAN HIGH-SPEED MOLD OVENS



COLEMAN PORTABLE MOLD DRYERS

Circle 575 on Page 51

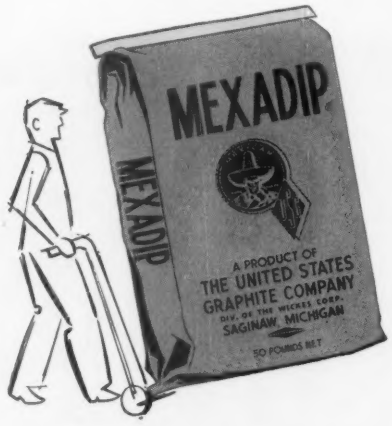
WASHES · WAS

no matter what the application . . . there is Mold Wash for every foundry need . . . or

SIPAC®

with only the addition of water, produces a bright, gold-colored coating with fine, smooth surfaces, using any foundry sand. It's non-carbonaceous and inert and will not react with any molten metal, including grey iron and steel. Resists flaking and completely protects core surfaces. You get improved casting quality. Sipac is available in 55 gallon drums, ready for mixing and dilution to desired Baume — even to a scale of 32 — without settling.

MEXICAN® VV FLAKE ("volatile vehicle")— meets the growing demand for good mold and core wash suited to carbon dioxide mold-core hardening process. Completely compatible with isopropyl alcohol, oleum spirits, kerosene or similar agents, Mexican VV Flake provides extra refractory protection . . . improves skin hardness . . . gives better casting quality. Comes in paste form, suitable for application by spraying or dipping.



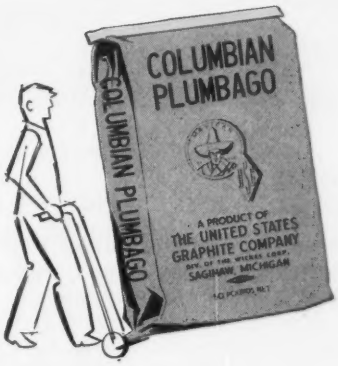
MEXADIP® — refractory core coating containing its own binder, requires only water to prepare it for use. Will not ferment, produces a very uniform, even coating over entire core with practically no sagging, running or dripping. Use it throughout foundry for green or baked cores, ferrous or nonferrous foundry practice.

THE UNITED STATES

GRAPHITAR® CARBON-GRAPHITE • **GRAMIX®** POWDERED METAL PARTS • **MEXICAN®** GRAPHITE PRODUCTS • **USG®** BRUSHES

HES · WASHES

a United States Graphite Company Core or one may be engineered to your requirement



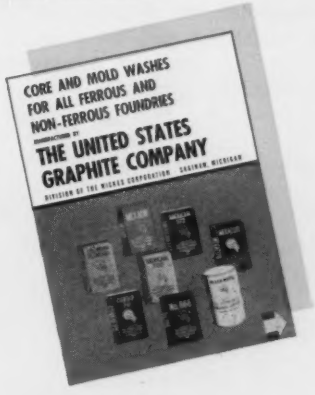
MEXICAN® COLUMBIAN PLUMBAGO— versatile wet blacking used for loam work, green or dry sand or torch dried molds where soft coat with high resistance is required. Suitable for all types of castings, including those of over 25 tons, high steel mixtures and castings poured at high temperatures.

SLICK RITE® — compounded from a base of high quality flake graphite to produce best slicking qualities, Slick Rite is applied to green sand molds by hand rubbing, tooling or brushing. Excellent casting quality obtained when mixed with water and molasses to produce wet lead for spraying molds and cores.

MEXICAN® 172—high refractory wet blacking with binder. For application to both molds and cores of heavy sectioned castings where best possible finish is required under severe pouring conditions.

No. 866® —is a wet blacking without binder. Provides soft coating with good refractory properties for molds and cores of medium and light sectioned castings. Also makes good blacking for bell end cores in pressure pipe manufacture. Can be applied by spraying, brushing or swabbing at 40-45 Baume.

MEXICAN® 700 — is particularly suitable for large molds and dry sand cores of high carbon iron such as cast iron rolls and ingot mold castings poured at intermediate temperatures. Contains no binder.



Write today for engineering bulletin No. 17 giving complete details and application methods of core and mold washes for all ferrous and nonferrous foundries.

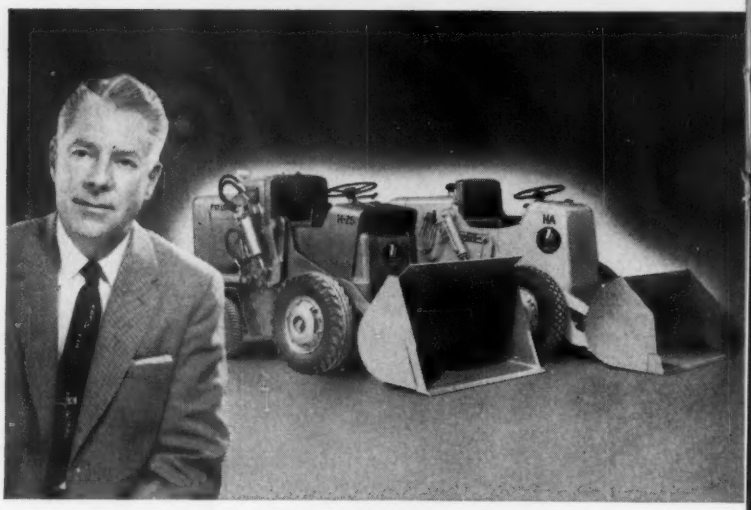
GF-244-2

GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION, SAGINAW 14, MICHIGAN

(Advertisement)

Report on the All-New Model H-25 **PAYLOADER**®



by G. A. Gilbertson,
President of The Frank G. Hough Co.

Recently I had the pleasure of personally delivering the 10,000th production model HA "PAYLOADER" to our distributor in the metropolitan Chicago area.

Because our company pioneered the first unit-designed, rubber-tired front-end loader and because this quantity of 10,000 of a single model is more than all other manufacturers combined have produced, we were justifiably proud of our accomplishment and the acceptance of our product by industry.

Inasmuch as we anticipate a continued demand for this model HA, we plan to continue its production, even though we are now introducing a completely new machine, the model H-25.

More "Payloader" Pioneering

This new H-25 "PAYLOADER" is in a class by itself as far as capacity, productive ability and features are concerned. It is a quality machine in ***every*** sense of the word.

While it will be priced higher than the model HA, and units competitive to that model, it will be a profitable investment, since it can handle materials at a ***lower cost per yard*** and that, in the final analysis, is ***most important*** to the user.

In this connection, your Hough Distributor has available the broadest and most complete set of financing plans offered: time payment and leasing plans, with or without option to purchase . . . any and all kinds of financing to best fit your needs.

What is so different about the new H-25?

More Capacity and Maneuverability

In terms of capacity alone, it is in a class by itself . . . the only machine with a ***carry capacity*** of 2,500 lbs., at average operating speeds of 4 m.p.h.

With a bigger and heavier unit having more capacity, it would be logical to expect you would need more room to operate. On the contrary, not only can this new H-25 negotiate 6-foot box car doors with ease . . . it actually has a turning radius (measured to the outside rear hub) which is LESS than ANY other rubber-tired tractor-shovel.

How Important is Carry Capacity?

How much a loader can handle and move depends on the ***carry capacity*** . . . not on the static lifting capacity. The proper size of the bucket for any loader depends on the ***average weight*** of the material to be handled ***in relation*** to the machine's ***carry capacity.***

Thus, with the H-25 "PAYLOADER" if you want to handle the maximum load of material weighing 125 lbs. per cubic foot, you can use a bucket with an S.A.E. rated capacity of 20 cu. ft. and move loads of 2,500 lbs., which is the carry capacity of the unit.

If you consistently handle heavier materials, you should use a smaller bucket or if you handle nothing but lighter loads, you can use a bigger bucket. The ***important*** thing is to stay within the recommended carry capacity.

The H-25 Has Extra "built-in" Strength

Regardless of its size and recommended capacity, some operators will always push equipment to extremes. This abuse will inevitably result in extra maintenance and even failure. That is why we have engineered extra strength and stamina throughout the H-25 . . . for your protection.

What About Individual Features?

There are dozens of them! The new power-shift transmission and a new torque-converter are matched

to give the ultimate in speed and ease of operation. The H-25 has a two-speed, full-reversing transmission. Power-steering adds to handling ease.

This new "PAYLOADER" is equipped with sealed, self-adjusting brakes and is the only unit of this class offering this important feature.

The H-25 has a maximum dumping height that is 6½ inches higher than the average of other loaders now being offered in this general capacity range.

This new unit is powered by a 44 HP gasoline engine with overhead valves for better performance and wet sleeves for easier maintenance. LPG (liquified petroleum gas) and diesel power are available.

Dig-ability?

When it comes to digging power, the H-25 gives you 4,500 lbs. of breakout force and, like other "PAYLOADER" front-end loaders, provides a bucket tip-back of 40 degrees, ***at ground level!*** As the bucket raises, a further tip-back to 65 degrees helps retain maximum loads.

Protective Features

If you are concerned with dust and dirt like most chemical, fertilizer and foundry operators are, you will appreciate the extra protective features engineered into the H-25. For example, the engine is afforded maximum protection with triple air cleaners — a precleaner and dual oil-bath air cleaners.

This "PAYLOADER" has a filtered hydraulic system. The oil reservoir is a closed, pressure-control type, electrically welded.

The sealing of the majority of all pivot points reduces maintenance. Transmission and torque-converter oil is cooled by the engine radiator cooling system.

Other Features

This new H-25 is equipped with high-traction differential which automatically transfers more torque to the drive wheel with the best footing when slippage is encountered.

The fuel tank has sufficient capacity for eight full hours of operation, thereby eliminating the need for refueling during any shift.

The H-25 is equipped with a 12-volt electrical system. In addition to the usual standard equipment that includes fuel gage, oil-pressure gage and engine temperature gage, there is also a torque-converter temperature gage and an Hourmeter.

There are many, many more features which we think you will be interested in. The many interchangeable attachments now available for the model HA "PAYLOADER" can also be used on the new H-25. Contact your "PAYLOADER" distributor or write us direct for literature and specifications. The Frank G. Hough Co., 703 Sunnyside Ave., Libertyville, Ill.

5-A-1

SAY "HUFF"

Modern Materials Handling Equipment

THE FRANK G. HOUGH CO.

LIBERTYVILLE, ILLINOIS

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

The H-25 "PAYLOADER" will be shown at both the FOUNDRY SHOW in Cleveland, May 19-23 and the NATIONAL MATERIALS HANDLING SHOW also in Cleveland, June 9-12, 1958.

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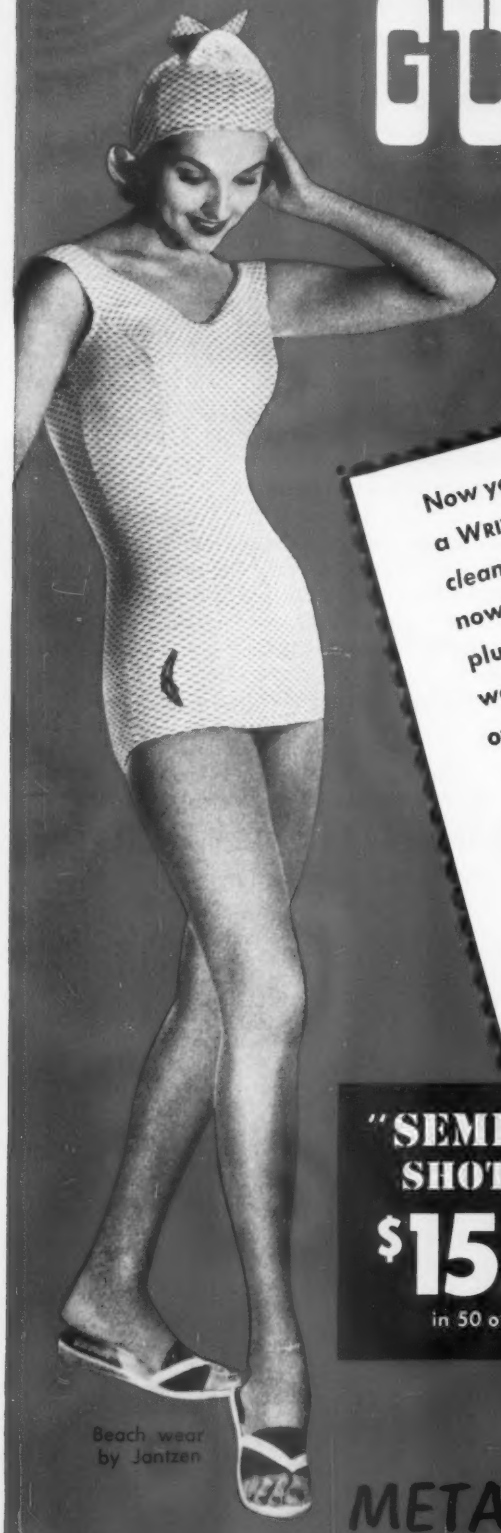
GUARANTEED SAVINGS



Beach wear by Jantzen

Now you can change to "SEMI-STEEL" abrasives and get a WRITTEN GUARANTEE from Metal Blast that you'll cut cleaning costs — no matter what steel abrasive you're now using! Reports from foundries using "SEMI-STEEL", plus our own laboratory tests, have convinced us that we can definitely guarantee savings in cleaning costs, over any other steel abrasive on the market.

"SEMI-STEEL" is a newly developed abrasive with steel shot characteristics. It is produced by an entirely new process, so efficiently, that it can be sold at malleable shot prices! "SEMI-STEEL" is manufactured as shot and grit, to S.A.E. specifications. Its performance compares so favorably to that of regular, high grade steel shot that, considering its extremely low price, you can't help but reduce your cleaning costs.

"SEMI-STEEL" SHOT AND GRIT

$155 per ton

in 50 or 100 lb. bags

FREE LAB TEST

We invite you to send us a sample of your present steel shot (at least 200 grams). We'll run a test on it, against "SEMI-STEEL", and report the results. Or, we'll gladly send a sample of "SEMI-STEEL" for testing in your own lab. (Give size required.) Either way, you'll get welcome proof of "SEMI-STEEL" savings!

So, why continue paying high prices for steel shot cleaning? Write for more information on "SEMI-STEEL" — send in your sample or request our sample for testing. Take this first step toward savings, right now!

METAL BLAST, INC.

872 EAST 67th STREET • CLEVELAND 3, OHIO

THE LARGEST INDEPENDENT MANUFACTURER OF ABRASIVES — STEEL-TYPE, CHILLED AND MALLEABLE

Late News

FORD REALIGNMENT: Ford Motor Co. has realigned its manufacturing operations into six divisions. These divisions, in turn, become components of two new groups—the Power Train Group and the Body Group. The former, which will include the Engine and Foundries Div., with M. L. Katke as general manager, will be headed by C. H. Patterson, recently elected a vice president. Ray H. Sullivan, vice president in charge of the former engine and foundry and metal stamping groups, has been relieved at his request of direct line responsibilities. Mr. Sullivan, who will reach retirement age in September, will work on special projects.

ARMY TALKS CASTINGS: A conference on the use, design, specifications, and importance of steel castings was held at Fort Belvoir, Va., April 15-17, under sponsorship of the Corps of Engineers, U. S. Army Corps Engineers Research and Development Laboratories, in cooperation with other government agencies. The program was presented jointly by the Steel Founders' Society of America, the Alloy Casting Institute, and the Investment Casting Institute.

NEW PLANT: Western Foundry Co., Portland, Oreg., producer of gray iron castings, has purchased a site for a new foundry on Hunziker Street near Highway 217. Construction of the plant was expected to start this month. Replacement of the company's old foundry on Water Avenue was necessitated by the building of a freeway extension into Portland.

HEADS TEXAS FOUNDRIES: R. S. Bradshaw Jr., vice president and plant manager, Texas Foundries Inc., Lufkin, Tex., has been elected president, succeeding the late Col. Cal C. Chambers. Jack O. Klein and Cal C. Chambers Jr. have been elected directors.

FORM COMPANY: George J. Ries, formerly vice president and factory manager, and Charles Rozanas, formerly sales manager, Casting Div., Advance Aluminum Castings Corp., Chicago, have formed a sales company, R & R Metal Products Inc. With headquarters at 11622 South Western Ave., Chicago, the company will represent producers of ferrous and nonferrous castings. It also has bought from Advance Aluminum a division for manufacture of aluminum squirrel-cage blower wheels used in air conditioning and heating equipment. Advance Aluminum stockholders recently approved a resolution to dispose of substantially all the assets of the company.

SCRAP SLUGGISH: Prices of iron and steel scrap continue soft in the face of slow demand. Average quotations, which are nominal in many instances, have lost the small gains made earlier this year and are back near the levels of last November and December. Supplies are more than ample.

FEWER INJURIES: Accident frequency rate in gray iron and malleable foundries dropped 14 per cent in 1957, according to the U. S. Department of Labor. Steel foundries showed a 10 per cent reduction, but nonferrous foundries had a 3 per cent increase. The average for all manufacturing was down 8 per cent to a rate equal to about one-half that of the foundry industry.

GRAY IRON CONTEST: June 20 is the deadline for entries in the casting design contest sponsored by the Gray Iron Founders' Society, National City-East Sixth Bldg., Cleveland 14. Anyone connected with the metalworking industry is eligible to enter. Seven cash prizes totaling $850 are offered to the winners, and every bona fide entrant will receive a copy of the new *Gray Iron Castings Handbook*.

PERSONALS: W. T. Ellison has been appointed chief engineer, Michigan-Standard Alloy Casting Co., Detroit . . . Max DeHaas is newly appointed vice president-engineering, Youngstown Foundry & Machine Co., Youngstown, Ohio . . . Ben Kaufman has been elected a vice president, Ajax Metal Div., H. Kramer & Co., and will continue as general manager of Philadelphia operations . . . Lester J. Miller, vice president in charge of operations, A. P.

Green Fire Brick Co., Mexico, Mo. has been named executive vice president . . . Arthur B. Penters has been appointed western Michigan representative for Archer-Daniels-Midland Co., Federal Foundry Supply Div. He replaces Joseph Hekler, assigned to the eastern Michigan area . . . John G. Frischkorn Jr. is new sales manager, Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio, succeeding A. F. Anjeskey, retired . . . Earl L. Johnson has been made central western representative, Cast-Master Inc., Bedford, Ohio . . . Frank J. Palermo has been named to the newly created post of director of manufacturing, J. I. Case Co., Racine, Wis.

MATERIAL HANDLING: Dollar volume of business in material handling equipment during the first quarter was about the same as that of the preceding quarter, according to the Material Handling Institute. Steady increases are seen for the second and third quarters.

FOUNDRY INSTRUCTION: Cleve H. Pomeroy, chairman, National Malleable & Steel Castings Co., will be the principal speaker at the dinner to be held June 20 during the third annual AFS Foundry Instructors Seminar. The seminar will be conducted at Case Institute of Technology, Cleveland, June 19-21. Instructors in foundry and pattern shop courses in secondary and vocational schools and teacher-training institutions are being invited to attend. Purpose of the seminars is to encourage closer relations between schools and the foundry industry.

MISCELLANY: Kensington Foundry Co., Buffalo, has been incorporated with $100,000 capital stock. Directors are John S. Cantwell, William R. Emblidge, and Howard K. Rose . . . Hoeganaes Sponge Iron Corp., Riverton, N. J., has started marketing of sponge iron briquets as raw material for production of quality steel . . . National Cylinder Gas Co., Chicago, plans to change its name to Chemetron Corp. . . . Applied Research Laboratories, Glendale, Calif., has become a wholly owned subsidiary of Bausch & Lomb Optical Co., Rochester, N. Y. . . . Symington-Gould Corp., Depew, N. Y., has changed its name to Symington-Wayne Corp., following its merger with Wayne Pump Co. . . . Stockholders of National Supply Co. and Armco Steel Corp. have voted to merge, effective April 30.

Prices of Foundry Metals and Coke

(As of April 21, 1958)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$18.00-18.50
OVEN	
Birmingham	$28.85
Buffalo	30.50
Detroit	30.50
Erie, Pa.	30.50
Indianapolis	29.75
Kearny, N. J.	29.75
Milwaukee	30.50
Montreal, Que.	31.00
Neville Island (Pittsburgh)	29.25
New England, deld.	31.55
Painesville, O.	30.50
Philadelphia	29.50
St. Louis	31.50
St. Paul	29.75
Swedeland, Pa.	29.50
Terre Haute, Ind.	29.75

PIG IRON

(Per gross ton f.o.b. furnace)

	No. 2 Foundry	Malleable
Birdsboro, Pa.	$68.50	$69.00
Birmingham	62.50	66.50
Buffalo	66.50	67.00
Chester, Pa.	67.00	67.50
Chicago	66.50	66.50
Cleveland	66.50	66.50
Duluth	66.50	66.50
Erie, Pa.	66.50	66.50
Everett, Mass.	68.00	68.50
Fontana, Calif.	75.50	....
Geneva, Utah	66.50	....
Granite City, Ill.	68.40	68.90
Neville Island (Pittsburgh)	66.50	66.50
Swedeland, Pa.	68.50	69.00
Toledo, O.	66.50	66.50
Troy, N. Y.	68.50	69.00
Youngstown, O.	....	66.50

NONFERROUS INGOT

(Cents per pound, carlots)

BRASS AND BRONZE: Red brass, No. 115, 25.25; tin bronze, No. 225, 34.00; No. 245, 28.75; High-leaded tin bronze, No. 305, 29.25; No. 1 yellow, No. 405, 20.75; manganese bronze, No. 421, 23.00.

ALUMINUM: 99 per cent plus primary ingots 26.10. Secondary No. 12 alloy, 21.25-21.50. Deoxidizing grades: No. 1, 23.25; No. 4, 18.00.

MAGNESIUM: 99.8 per cent notched ingots 36.00, f.o.b. Velasco, Tex. (10,000 lb or more).

COPPER: Electrolytic 25.00, delivered Connecticut valley.

ZINC: High grade 11.00, delivered. Die casting alloy No. 3, 13.75; No. 2, 14.75, delivered.

IRON AND STEEL SCRAP

(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$30.00-31.00	$49.00-50.00	.....	.....	.....	.....	$47.00-48.00
Boston*	**24.00-25.00	**29.00-30.00	.....	.....	**33.00-34.00	.....	.....
Buffalo	28.00-29.00	**41.00-42.00	.....	.....	**46.00-47.00	.....	53.00-54.00
Chicago	30.00-32.00	38.00-39.00	.....	43.00-44.00	43.00-44.00	48.00-49.00	52.00-54.00
Cincinnati*	**28.50-29.50	**38.00-39.00	**32.00-33.00	.....	**45.00-46.00	.....	52.00-53.00
Cleveland	29.00-30.00	42.00-43.00	33.00-34.00	42.00-43.00	47.00-48.00	60.00-61.00	56.00-58.00
Detroit*	**21.00-22.00	**28.00-29.00	**21.00-22.00	**29.00-30.00	.....	.....	.....
Los Angeles	32.00	**38.00	.....	.....	.....	.....	.....
New York*	32.00-33.00	35.00-36.00	33.00-34.00	.....	.....	.....	.....
Philadelphia	37.00	39.00	42.00	.....	49.00	60.00-61.00	57.00-59.00
Pittsburgh	33.00-34.00	44.00-45.00	.....	44.00-45.00	51.00-52.00	.....	54.00-53.00
St. Louis*	32.00	44.00	33.00	45.00	.....	.....	54.00
San Francisco	32.00	42.00	28.00	40.00	40.00	.....	.....
Seattle	30.00	31.00	28.00	.....	.....	.....	.....

*Brokers' buying prices. **F.o.b. shipping point

DO IT YOURSELF

WHITEHEAD'S X-TRUDE-A-SEAL

Costs less than any packaged preformed strips

Visit us
BOOTH
1322
ARCADE

Stoller Chemical Co.'s X-TRUDER extrudes up to 45 ft. of seal strip per minute!

YOU'RE ON THE TARGET when you do it the X-Trude-A-Seal way! —

- Make your strips daily as you need them
- Re-extrude all leftovers the next day to desired sizes
- Sizes from ¼" to ¾" diameter

- Will not dry out or crack
- Economical — eliminates waste of material
- Applies faster than preformed extruded strips
- Reduces chipping, grinding, porous metal, leakers
- Eliminates uneven casting walls, excessive fins

Of course, Joint Seal is available for hand rolling, hand gun, or use with Stoller X-Truder

***FIND OUT HOW MUCH YOU CAN SAVE** — contact your distributor . . . or write direct*

Whitehead Brothers COMPANY

Established 1841

NEW YORK OFFICE
324 West 23rd St., New York 11, N. Y.

NEW ENGLAND OFFICE
17 Exchange Place, Providence, R. I. 1

Manufacturers of

LYQUAGRIP
Ready-to-use core paste

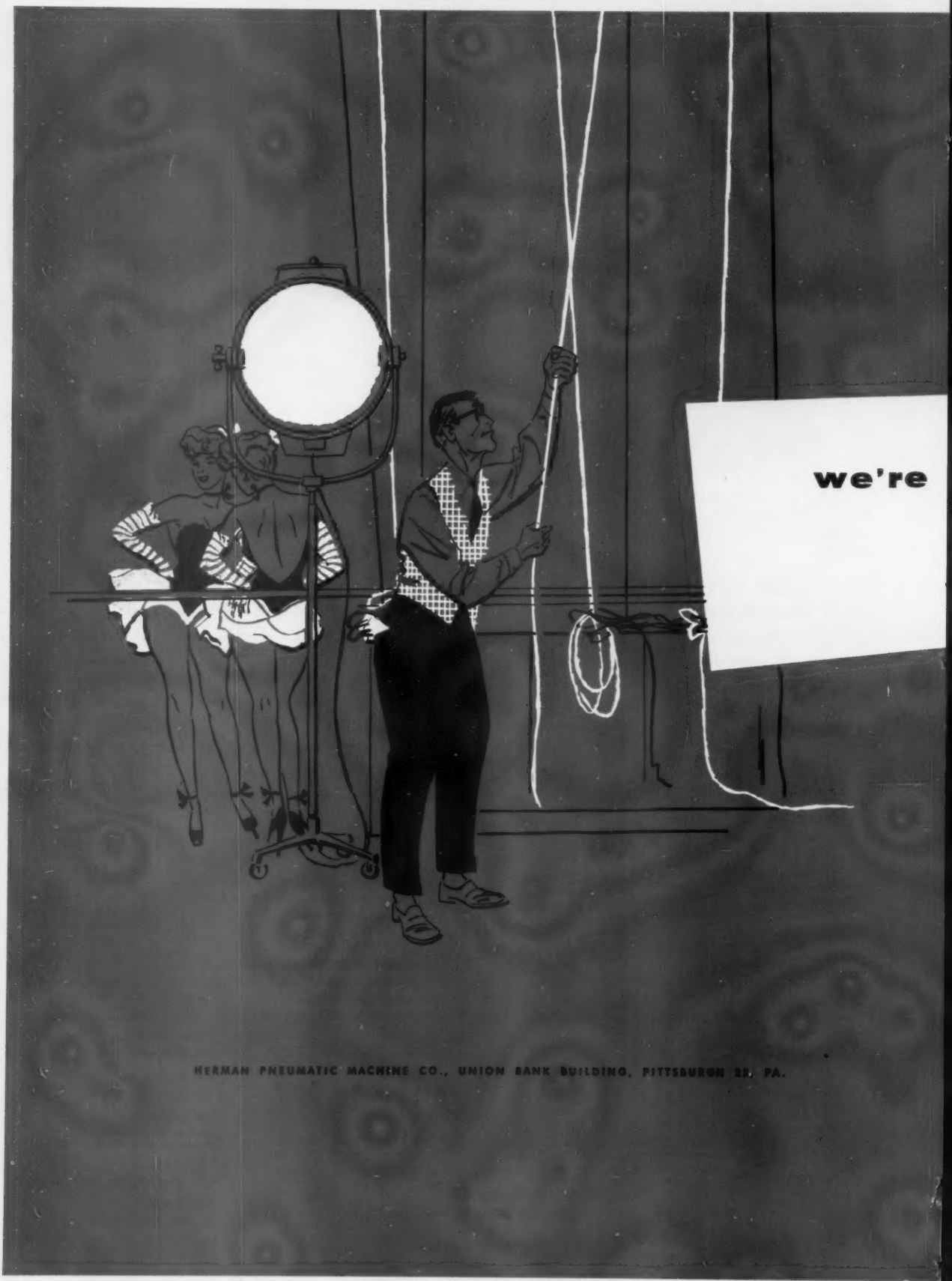
DUO RESIN
Binder for baking with controlled oven temperatures

JOINT SEAL
Plastic compound for perfect sealing

LYQUAFACE
The liquid sand grain coating

DOB-IT
Ready-to-use core mudding compound

Circle 579 on Page 51

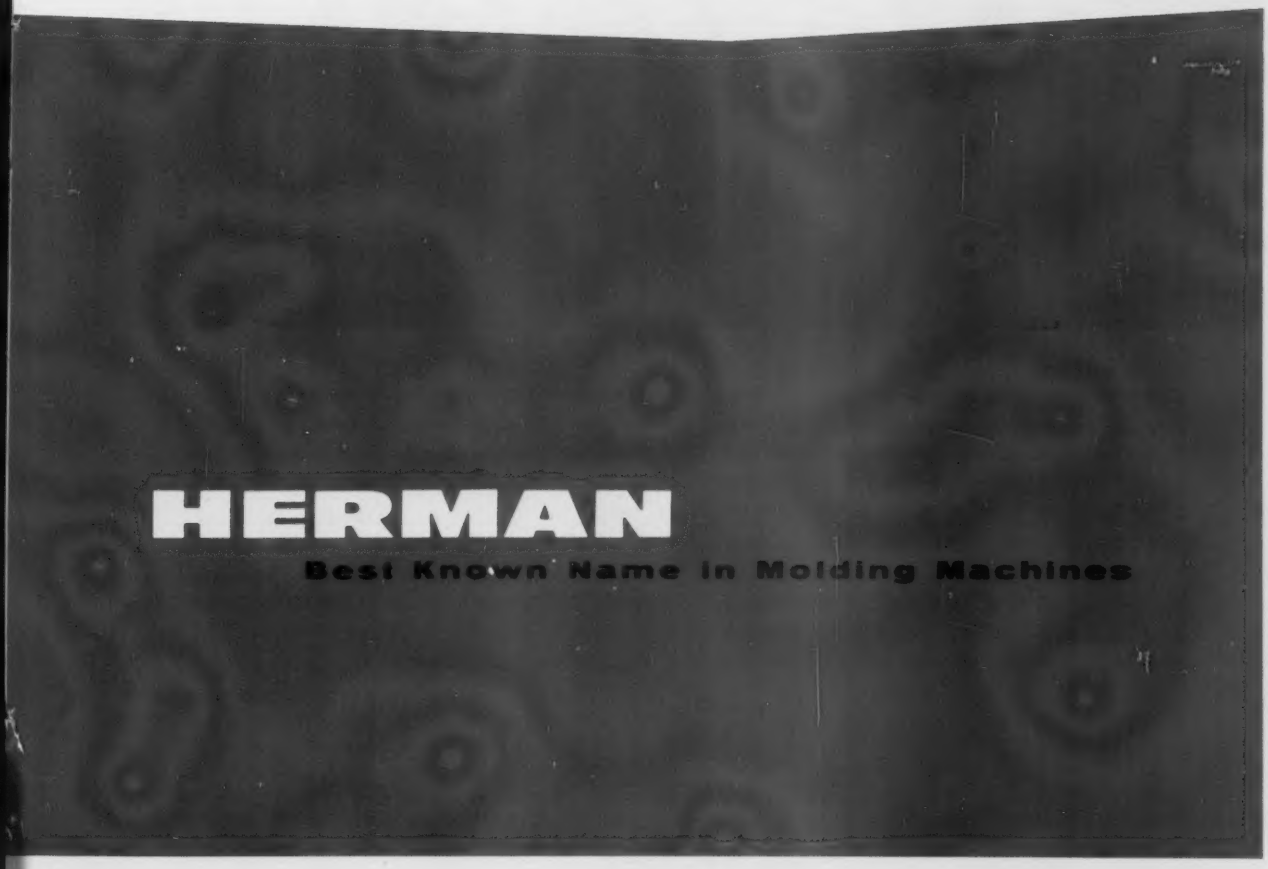


HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

raising the curtain on something NEW

STOP IN AND SEE US AT THE CONVENTION

HERMAN Booth 2117-2119



Circle 580 on Page 51

Ultimately, *somebody* has to get rid of "plant" dust, dirt, smoke and fumes. If the job is left up to workers or neighbors, the cost to management is exorbitant. Worker morale and efficiency drops, neighborhood relations deteriorate and plant cleaning costs continually climb.

The modern (and thrifty) way to attack the problem is with AAF Dust Control applied at all dust sources. This way, dust from grinders, shakeouts, cupolas, melting furnaces, abrasive cleaning or sand conditioning systems is trapped the instant it is produced. It never has a chance to irritate workers, arouse neighborhood housewives or run up your own plant cleaning costs.

Write for "The Anwers to the Five Basic Dust Problems" (Bulletin 270-A1). Address: Mr. Robert Moore, American Air Filter Company, Inc., 266 Central Ave., Louisville 8, Kentucky. In Canada: American Air Filter of Canada, Ltd., 400 Stinson Blvd., Montreal 9.

AAF American Air Filter
COMPANY, INC., LOUISVILLE, KENTUCKY

Circle 581 on Page 51

"SAY THAT AGAIN... ...I DARE YOU!"

■ Okay . . . we'll say it again! If you're all snarled up because of high cleaning room costs, there's an easy way to cut snagging time and whip the situation. Switch to CINCINNATI (PD)° SNAGGING WHEELS, the greatest grinding development in years!

It doesn't take any trouble to find out what our customers think of CINCINNATI (PD) SNAGGING WHEELS. They *roar* their praises of the fast, easy cutting action. Our customers report, too, that POSITIVE DUPLICATION (PD) means another saving. "ON GRADE" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

CINCINNATI (PD) WHEELS are made in vitrified and resinoid bonds for both ferrous and non-ferrous foundries and are available in a complete variety of sizes and shapes. *And these better, cost-cutting* (PD) SNAGGING WHEELS *are priced no higher than ordinary wheels.*

°Trade Mark Reg. U.S. Pat. Off.

So if you want to "Hold That Tiger" and hold down costs while improving performance, see your CINCINNATI Grinding Wheels Distributor or contact us direct. Write, wire or telephone Sales Manager, CINCINNATI Milling Products Division, Cincinnati 9, Ohio.

Remember—*only* CINCINNATI (PD) WHEELS give you

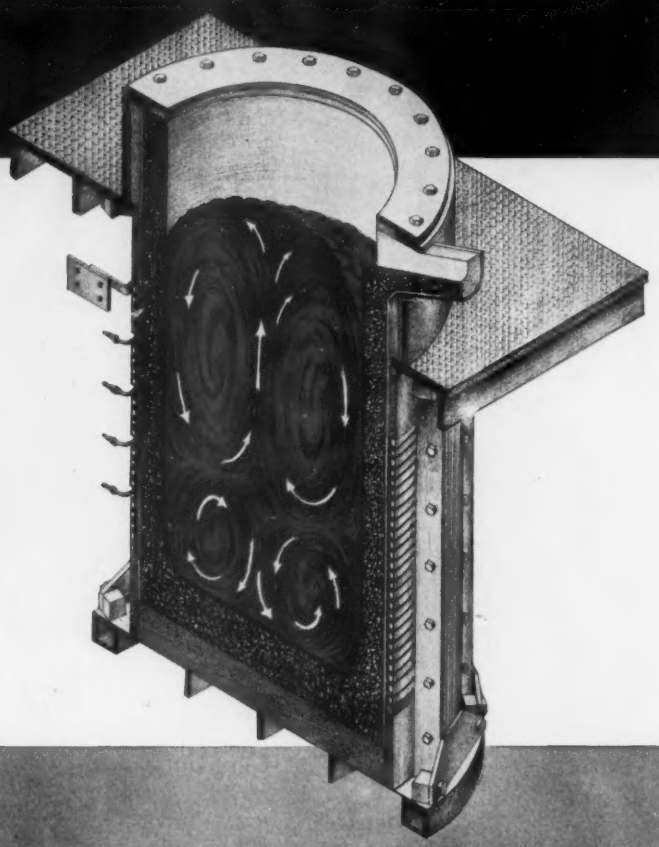
PD POSITIVE DUPLICATION

CINCINNATI° GRINDING WHEELS

A PRODUCTION PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

See it at the Show*

AJAX-JUNKER



CORELESS 60 CYCLE INDUCTION MELTING FURNACE

★
A.F.S. FOUNDRY SHOW
Cleveland, May 19-23
BOOTH NO. 1306

IF YOU ARE UNABLE TO ATTEND THE SHOW SEND FOR BULLETIN R-58

A cylindrical induction coil supplied with ordinary 60 cycle current induces heat and vigorous electromagnetic stirring in the molten metal charge. Integrated electric controls regulate power, maintain high power factor automatically. Monolithic refractory linings are made by ramming against the sturdy water-cooled coil held in a rigid frame of magnetic and structural steel.

This new principle was perfected in Europe over the last seven years. Over 100 Junker furnaces are now in use. AJAX-JUNKER designs are based on latest experience, using American components and practices throughout.

Outstanding results are proven in these fields:

DUCTILE AND ALLOY IRON CASTINGS
RECOVERY OF IRON TURNINGS
RECOVERY OF ALUMINUM SCRAP

Available sizes range from 1 to 10 tons, with normal melting cycles from 2 to 4 hours. Power ratings are 200 kw through 1500 kw.

AJAX USA

60 CYCLE INDUCTION MELTING

ENGINEERING CORPORATION

TRENTON 7, NEW JERSEY

Associated Companies: Ajax Electrothermic Corporation Ajax Electric Company

Circle 583 on Page 51

Hunter, hunted and hunting

Every important objective requires careful planning, careful "stalking"—whether it be for food, or for the flawless casting of precision parts for the aviation industry. To assure the quality of your product, and guarantee its dependability . . . do your stalking for those minute, but money-wasting flaws with Ansco industrial x-ray films. Ansco's superb Superay films can separate the most subtle tonal values to help your reading and discover trouble easily, quickly.

Ansco, Binghamton, New York. A Division of General Aniline & Film Corp.

Superay "A"
for general inspection

Superay "B"
for critical inspection

Superay "C"
for production line work

Ansco
Industrial X-ray

Circle 584 on Page 51

How Dave Beach's competitive analysis

Purchasing Director Dave Beach (left) and Bay State distributor Sherwin Haskell (right) discuss chart showing test results.

When a *supplier* thinks up ways to make a product test more rigid, you've really got something.

That's what happened when David D. Beach, Purchasing Director for Malleable Iron Fittings Co., Branford, Conn., decided to try to cut snagging wheel costs by eliminating the less efficient wheels among many different brands in use at M. I. F. He got the Engineering and Production Departments to set up a series of tests in which the comparative performances of 24"x3"x12" wheels from eight different manufacturers were to be rigorously compared over a period of several months.

Then Sherwin Haskell, of Bay State distributor, Perrigo, Inc., New Haven, suggested using a Time-Energy Analyzer to compute contact time and power consumption over the life of each wheel. This made it possible to compare *all* cost factors *accurately.*

cut snagging costs at M.I.F.

Higher grinding pressures were used to increase production. This required a new Bay State specification that resulted in deeper cut, less wheel bounce and maximum wheel economy.

Results showed that the Bay State wheel turned in *the lowest cost per pound of metal removed.* So it became M. I. F.'s standard snagging wheel. And Sherwin Haskell had the satisfaction of knowing that he had helped cut costs for one of the biggest combined malleable iron and steel foundries doing custom work in the entire country.

Like all Bay State representatives, Haskell not only knows the answers to ordinary grinding problems, he often comes up with *unusual* cost-cutting ideas, too. Why not talk to *your* Bay State man? *Better grinding at lower cost—that is his business.*

BAY STATE WHEELS of PROGRESS

BAY STATE ABRASIVES

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.
Branch Offices: Bristol, Conn., Chicago, Cleveland, Detroit, Pittsburgh. *Distributors:* All principal cities.

Circle 585 on Page 51

ANOTHER INDUCTO INSTALLATION...

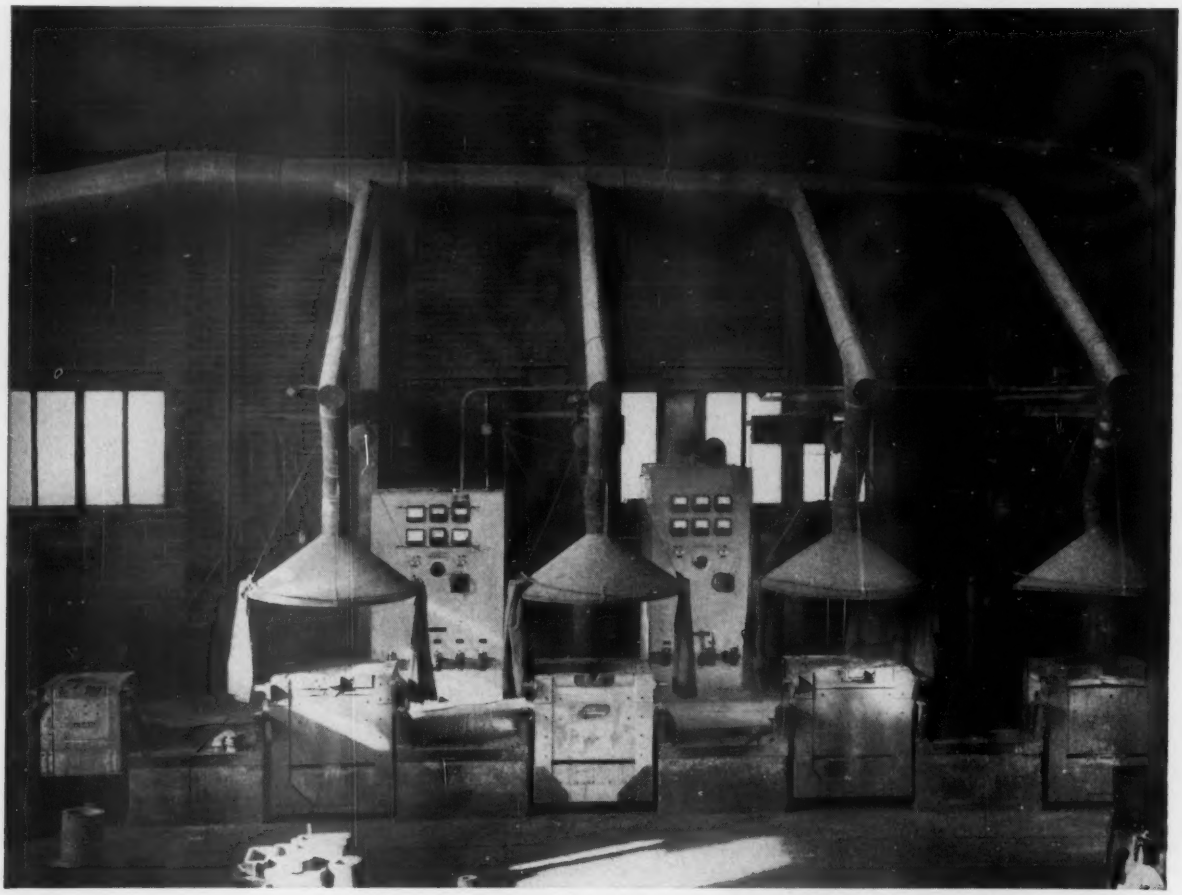


PHOTO COURTESY OF SORENSEN INDUSTRIES.

In Two Years Of Operation At Sorensen Industries, These INDUCTO Furnaces Saved More Than Their Cost

Since Sorensen Industries installed INDUCTO induction furnaces, they have reduced metal losses and minimized rejects. These benefits plus higher melting speeds have saved more than the cost of the furnaces in just two years of operation.

The installation includes four, 1000-pound furnaces which are operated from a 250 kw m-g set. A 50 kw m-g set is interlocked with the main unit so that it can maintain a molten bath in any of the four furnaces at holding temperatures. Four furnaces were used in this installation to eliminate contamination from one alloy to another.

You, too, can benefit from modern INDUCTO metal melting equipment. Want to know more? Write today. INDUCTO engineers will be glad to study your requirements. The Inductotherm Corporation, 412 Illinois Avenue, Delanco, New Jersey.

INDUCTOTHERM corporation

412 Illinois Ave. Delanco, N. J.

For High Quality DUCTILE IRON CASTINGS...

Specify NEVILLE ILP PIG IRON

IF YOU produce or plan to produce ductile iron castings, you'll be interested in these important facts about Neville ILP (Intermediate Low Phosphorus) Pig Iron.

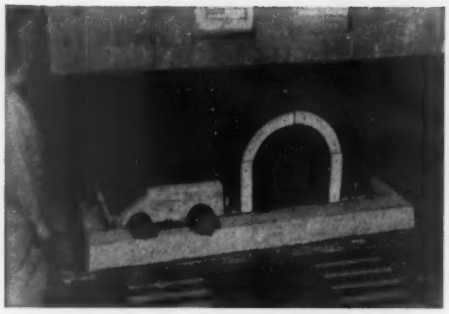
1. Neville ILP Pig Iron is manufactured by a merchant producer from *selected* raw materials.
2. It is a uniform, high quality iron with a controlled *minimum* of subversives.
3. It is produced and stockpiled within very close silicon ranges, and with sulphur, phosphorus and manganese content well below maximum limits specified by industry standards.
4. It is regularly used for the production of ductile iron castings by many of the nation's leading captive and jobbing foundries. (Names upon request.)

You'll discover that Neville ILP Pig Iron can meet the requirement of *any* ductile iron casting you make. And there's a good chance you'll be able to realize appreciable cost savings through its use!

Write or call today for more information about Neville ILP Pig Iron. Our technical service department will be glad to assist you in your application problems.

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

After only 90 seconds of vibrating, 2500 pounds of core "come clean".



CP Core Box Vibrator frees 3000 pound cores in 90 seconds!

In just a minute-and-a-half this Core Box Vibrator frees cores weighing up to a ton-and-a-half! Core output is greatly increased and you get a perfect draw every time. Cores come out with no flaws, damaged edges, distorted sections or dimensional variations . . . there's no time wasted troweling. Needs no special adaptors . . . the built-in air clamp holds the vibrator securely to any core box cleat up to 6¼" wide. Its 9000 orbital vibrations per minute eliminate sledging . . . reduce core box maintenance to a minimum. In spite of the core size, the CP vibrator is positioned only once. Write for free demonstration on your work.

Chicago Pneumatic Tool Company,
8 East 44th St., New York 17, N. Y.

Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Circle 588 on Page 51

Circle 589 on Page 51→

ENGINEERING

Engineering specialists are available to assist with pattern design and development.

WOOD PATTERN SHOP

Skilled craftsmen, modern woodworking tools combine to produce accurate masters.

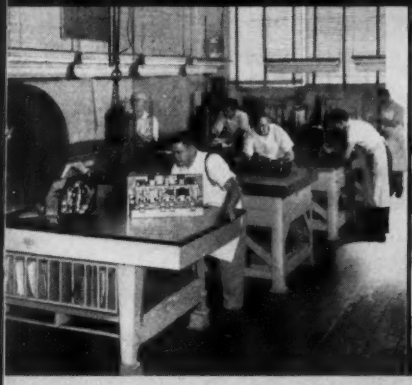
FOUNDRY

The latest electric furnaces, controls and methods insure the very finest pattern castings.

A *Complete* SERVICE...

METAL PATTERN SHOP

Experienced metalworking personnel carefully pilot patterns through each operation.



MACHINE SHOP

An efficient machine shop provides complete facilities for all pattern machining needs.

LABORATORY

Laboratory "in process" control and inspection insure consistent quality standards.

...FROM BLUEPRINT TO PRODUCTION PATTERN

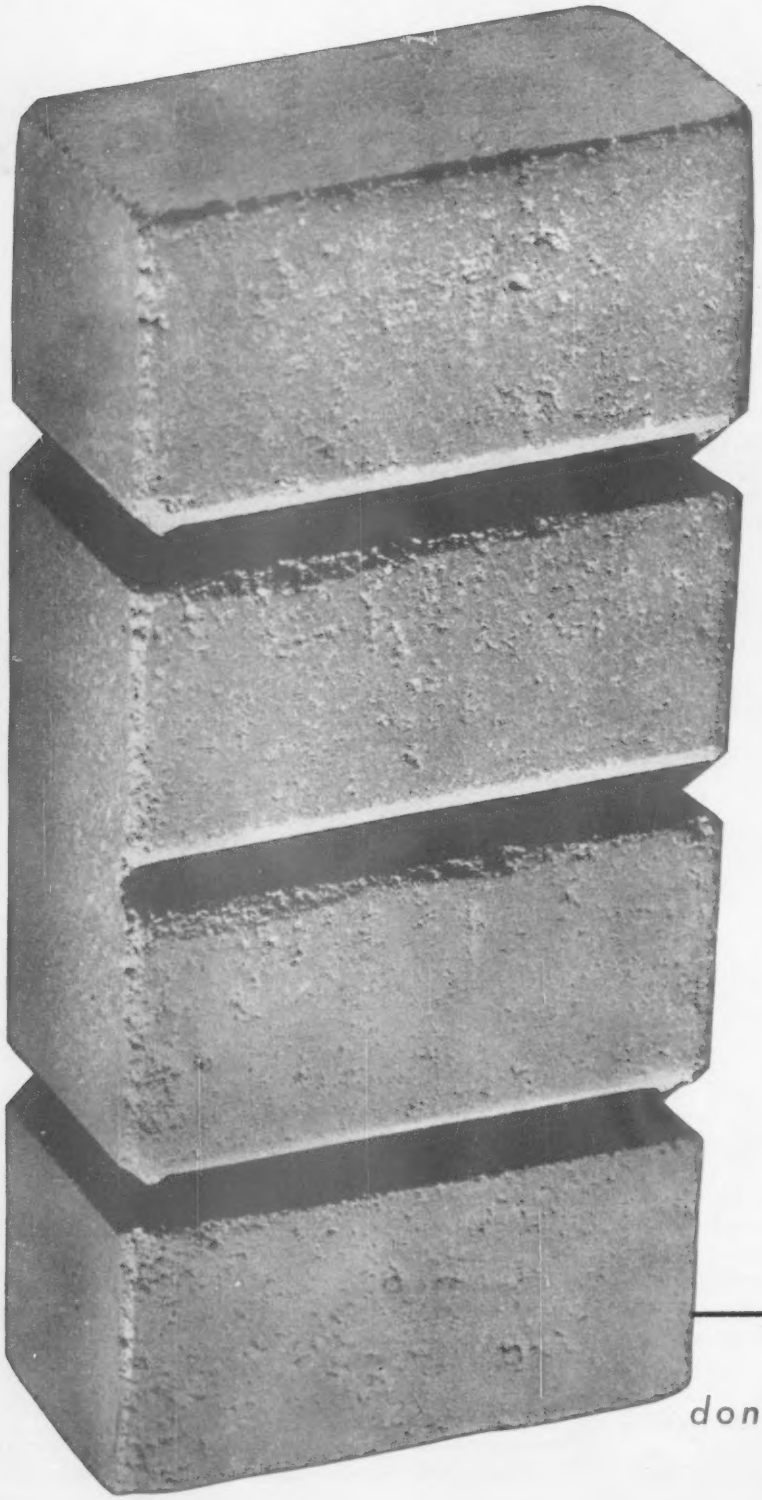
That's right! City Pattern Foundry and Machine Company is equipped with the modern, efficient machinery and staffed with the skilled, experienced personnel to offer you a complete, "start to finish" service on *all* your pattern requirements. Now, obviously, from the standpoint of convenience alone, it pays to have all phases of your pattern development and production under one roof. But convenience, though important, is actually just a "fringe benefit" of City Pattern Foundry and Machine Company service. More important . . . and the reason why so many leading manufacturers rely on our pattern making facilities and knowledge . . . is the fact that our entire operation is geared to combine uncompromising accuracy with maximum efficiency. The result . . . over a period of more than 40 years . . . has been patterns of the finest possible quality at the lowest possible cost.

And that's not all! We're well equipped to serve you in a number of other ways, too. Our foundry department, for example, is one of the most modern and versatile in this section of the country for experimental or production castings, for high conductivity copper, copper alloy, brass and aluminum castings. What's more, City Pattern Foundry and Machine Company offers you complete facilities for fast, accurate, economical machining and fabricating. Want detailed information? Write or call today.

CITY PATTERN
FOUNDRY AND MACHINE CO.

1161 HARPER AVE. • DETROIT 11, MICH.
PHONE: TR 4-2000

Cleaner Gray Iron Begins Here



...The Most Economical ...The Most Dependable way to Cleaner Iron

don't accept substitutes

Famous CORNELL ...CUPOLA FLUX

There's nothing equal to Famous Cornell Cupola Flux for purifying molten iron. Here's why!

Famous Cornell Flux purifies metal by chemically reacting with the molten mass to increase fluidity of iron and slag. There is less digging out and downtime. Castings are free from hollow centers and hard spots. Machining is easier. In addition, Famous Cornell Cupola Flux gives a protective glaze to cupola linings to protect them from the ravages of the molten metal. Why not call a Cornell Engineer to help you with your iron making problems? Or write for Bulletin 46-B.

Have you tried Famous Cornell Aluminum Flux?

Have you tried Famous Cornell Brass Flux?

Write for Bulletin 46-A

The CLEVELAND FLUX Company

1026-40 MAIN AVENUE, N. W. • CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes—Since 1918

FAMOUS CORNELL FLUXES

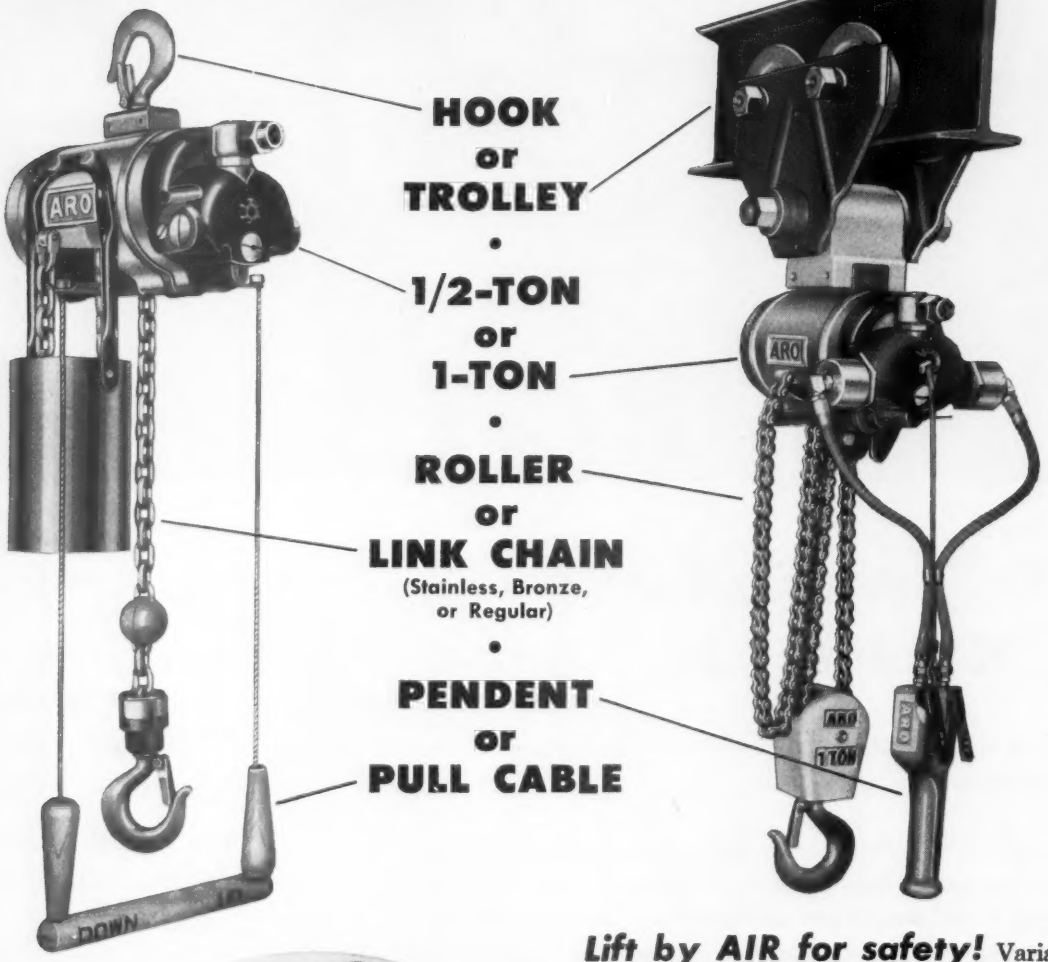
Trade Mark Registered

Circle 590 on Page 51

Your choice

any combination of these features with

ARO AIR HOISTS



HOOK
or
TROLLEY

•

1/2-TON
or
1-TON

•

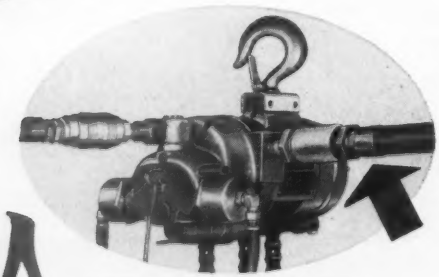
ROLLER
or
LINK CHAIN
(Stainless, Bronze, or Regular)

•

PENDENT
or
PULL CABLE

Lift by AIR for safety! Variable speed . . . 0 to 38′ per minute . . . load can be inched or zipped. With ARO you get *exactly* the right Air Hoist for your job. See your ARO Distributor.

THE ARO EQUIPMENT CORPORATION
Bryan, Ohio
Aro Equipment of Canada, Ltd., Toronto 15, Ont.
Offices in All Principal Cities



Plus PIPED EXHAUST

for special applications in chemical and pharmaceutical plants. Ideal for paint spray areas.

ARO®
AIR HOISTS
. . . Also Air Tools . . . Automation Tools . . . Paint Pumps . . . Material Handling Pumps . . . Industrial Lube Equipment

Circle 591 on Page 51

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FURTHER INFORMATION on Advertised Products ?

May 1958

SIMPLY CIRCLE AD ITEM NUMBER BELOW

551	566	581	596	611	626	641	656	671	686	701	716	731	746	761	776	791	806	821	836	851	866	881	896
552	567	582	597	612	627	642	657	672	687	702	717	732	747	762	777	792	807	822	837	852	867	882	897
553	568	583	598	613	628	643	658	673	688	703	718	733	748	763	778	793	808	823	838	853	868	883	898
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556	571	586	601	616	631	646	661	676	691	706	721	736	751	766	781	796	811	826	841	856	871	886	901
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558	573	588	603	618	633	648	663	678	693	708	723	738	753	768	783	798	813	828	843	858	873	888	903
559	574	589	604	619	634	649	664	679	694	709	724	739	754	769	784	799	814	829	844	859	874	889	904
560	575	590	605	620	635	650	665	680	695	710	725	740	755	770	785	800	815	830	845	860	875	890	905
561	576	591	606	621	636	651	666	681	696	711	726	741	756	771	786	801	816	831	846	861	876	891	906
562	577	592	607	622	637	652	667	682	697	712	727	742	757	772	787	802	817	832	847	862	877	892	907
563	578	593	608	623	638	653	668	683	698	713	728	743	758	773	788	803	818	833	848	863	878	893	908
564	579	594	609	624	639	654	669	684	699	714	729	744	759	774	789	804	819	834	849	864	879	894	909
565	580	595	610	625	640	655	670	685	700	715	730	745	760	775	790	805	820	835	850	865	880	895	910

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POSITION .....

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STREET .....

CITY ..... ZONE.....

STATE .....

PRODUCT MANUFACTURED .....

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558	573	588	603	618	633	648	663	678	693	708	723	738	753	768	783	798	813	828	843	858	873	888	903
559	574	589	604	619	634	649	664	679	694	709	724	739	754	769	784	799	814	829	844	859	874	889	904
560	575	590	605	620	635	650	665	680	695	710	725	740	755	770	785	800	815	830	845	860	875	890	905
561	576	591	606	621	636	651	666	681	696	711	726	741	756	771	786	801	816	831	846	861	876	891	906
562	577	592	607	622	637	652	667	682	697	712	727	742	757	772	787	802	817	832	847	862	877	892	907
563	578	593	608	623	638	653	668	683	698	713	728	743	758	773	788	803	818	833	848	863	878	893	908
564	579	594	609	624	639	654	669	684	699	714	729	744	759	774	789	804	819	834	849	864	879	894	909
565	580	595	610	625	640	655	670	685	700	715	730	745	760	775	790	805	820	835	850	865	880	895	910

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STATE .....

PRODUCT MANUFACTURED .....

FOUNDRY

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FIRST CLASS
Permit No. 36
CLEVELAND, OHIO

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

—4c POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio

Reader's Service Dept.

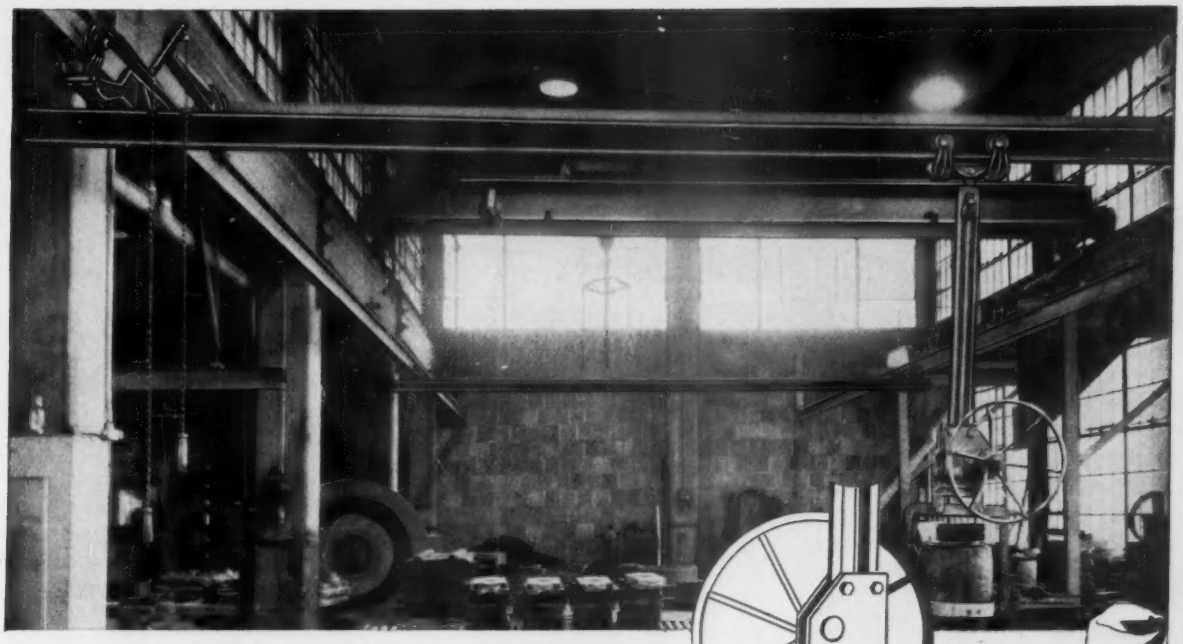
FIRST CLASS
Permit No. 36
CLEVELAND, OHIO

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

—4c POSTAGE WILL BE PAID BY—

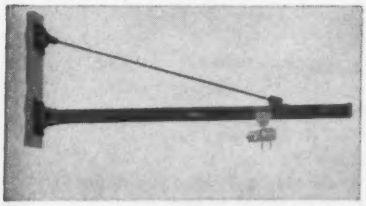
FOUNDRY
Penton Building
Cleveland 13, Ohio

Reader's Service Dept.

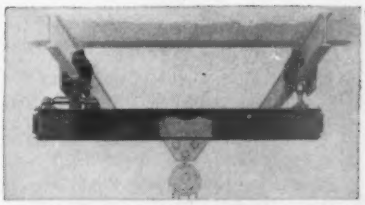


Reduce handling costs with . . . R-W CRANE and "TRU-TRED" MONORAIL SYSTEMS

Modern foundries have found that they can now efficiently and safely cut costs, and speed-up production by installing R-W Cranes and Monorail Conveyor systems. Whether you need a single unit for a specific operation or a complete system, R-W Cranes and Monorail Conveyors combine ladle handling with maximum smoothness and safety, plus 100% utilization of pouring floor area. Transfer crane with safety interlocks at transfer points provide flexibility and easy handling throughout pouring operations. R-W Cranes and Monorail systems are available in a size to efficiently and economically meet your specific requirements.



R-W 939 Swinging Jib Crane . . . available in a wide variety of sizes and capacities up to 4000 lbs. . . . Furnished with rod support. R-W 968 Jib Crane has curved track to support the outer end of boom.



R-W 971 Flexible Traveling Crane . . . self adjusting yoke and cross head . . . will not bind as bridge need not maintain right angles to tracks. Available in variety of sizes and capacities up to 8000 lbs. Not applicable as a transfer crane.

Why not let an R-W Sales-Engineer show you, without cost or obligation, how R-W equipment can effect remarkable savings for you in time, money and maintenance. Write today for complete information.

Richards-Wilcox
MANUFACTURING COMPANY
"MATERIAL HANDLING DIVISION"

466 W. THIRD STREET, AURORA, ILLINOIS • Branches in Principal Cities

Circle 592 on Page 51

(Advertisement)

Minerals International Chemicals

A REPORT TO FOUNDRIES

How Can You Justify a "Fancy Sand System"?

A foundryman asked us a rather startling question. "How can I justify the cost for supervision and materials to run one of these fancy sand systems you are always talking about?" In other words, how do you save money in the cost of producing a casting to offset the apparent cost of a carefully controlled sand system. Let's look at seven reasons.

Rapid Molding. Controlled flowability means true, clean surfaces with fewer jolts per mold, less down-time waiting for sand, fewer clogged sand hoppers, smoother operating sand handling equipment. Proper control of sand toughness permits rapid core setting, less patching and fewer broken molds – and reduces stickers and molding down time.

Faster Cleaning. Proper sand control means less burnt-in sand and metal penetration together with improved casting surfaces. These combine to provide faster and cheaper cleaning. More uniform mold hardness reduces grinding, chipping and reblasting.

Rapid Mulling. Special additives such as Plasti-Bond, with correct choice of clay, permits sand mixing in the minimum length of time – or better mulling in the same length of time. Proper sand control reduces the down-time and muller maintenance costs together with reduced power costs for the same amount of sand mulled.

Better Finish. Sands containing Plasti-Bond or Triplact or sands with the proper choice of clay combinations provide a better finish. This is not directly related to the cost of producing a casting but certainly is related to the cost of selling the casting. It is easier and cheaper to sell a good-looking product than it is a rough-looking product.

Easier Shake-Out. Correct control of the clay additions, plus the proper use of such things as Maplex, Triplact and Plasti-Bond, permits the easiest and fastest shake-out. This can mean the elimination of a bottle-neck or can be reflected in such simple things as reduced sand loss, lower maintenance and higher production.

Close Casting Tolerance. A really major item can be the actual casting weight or casting tolerance. This is particularly true when castings are sold by the piece and a price is established on the basis of an anticipated weight. Ignoring this factor can change total metal costs by 6% to 8%.

Lower Scrap Loss. Better and closer sand control helps reduce scraps from dirt and sand defects.

Unless everyone of these seven factors is as perfect as possible, you do not have a cheap sand regardless of how little you pay for clay or sand additives.

TECHNICAL SERVICE

RICHARD A. GREEN . . . *New Products Manager*

When Dick Green talks with you about sand problems, you quickly get the idea he knows what he's talking about. He does. With good reason, too, for he has a sound background of practical experience with foundry sands.

As a youngster, he worked summers with his dad in Michigan foundries. At the University of Detroit, he majored in chemical engineering. Then to work – first with a foundry supply manufacturer for two years as a quality control man in the foundry facing department.

Then H. W. Dietert put him in charge of laboratory and research and eventually sales, service and sand consulting. While at Dietert, he collaborated in the preparation of a number of technical papers on sand and also assisted in conducting sand schools.

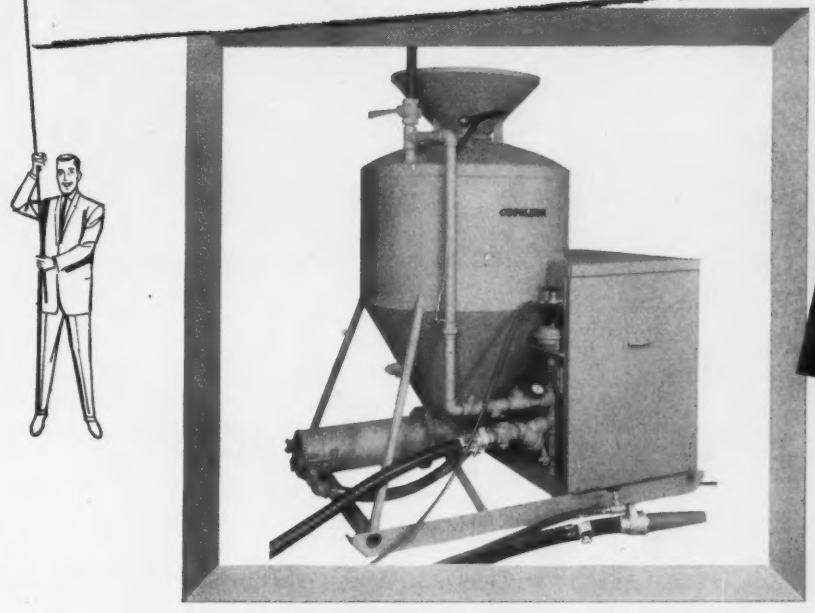
Dick Green joined Eastern Clay eight years ago as a salesman and service engineer. In due time, and because he so well deserved it, he was promoted to Eastern District Sales Manager. Now he has larger responsibilities as New Products Manager.

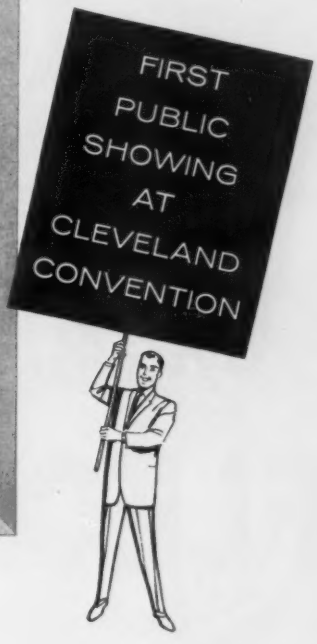
During the years he has worked in the foundry industry, Dick has been a member of AFS and active on sand committees.

Dick Green is one of the reasons we are so proud of our sales-service staff, a group of men who really know foundry sand and are able to be of great assistance in helping foundries lick their day-by-day operating problems.

(Advertisement)

Presenting the NEW CUPOLINOR SHM





You will want to stop at our exhibit and see the sensational new Cupolinor SHM. We use the word "Sensational" advisedly for we believe that when you see it you will agree with us that it is an outstandingly different and vastly improved foundry refractory gun.

Perhaps the one feature that will appeal to you most is that it is, actually, a one-man machine. Simple controls with two levers, located at the nozzle, enable the operator in the cupola to control air supply, moisture, operating pressures and the rate of material feed through the complete range from 75 pounds up to 400 pounds per minute.

Yes, that's what we said—the rate of feed ranges from 75 to 400 pounds per minute – and that's versatility such as you've never known before in a refractory gun.

The new Cupolinor is available in five sizes from 1000 to 6000 pound capacity. It is priced to be very attractive, but the operating economy is the important factor. Because it is a one-man machine, it will quickly pay for itself.

The new Cupolinor has features and advantages galore! It handles fine, dry castables, all heavy basic patching materials, and even wet rebound reclaimed from under the cupola. A worthwhile "plus" is less air consumption and reduction of hopper pressure. It also makes it possible to hook up to the material storage hopper so as to eliminate dust.

It has a new auger feed (as compared with the conventional gravity or orifice feed) that delivers a measured amount of material on each rotation of the auger. It gives a smooth flow of material without pulsating or clogging troubles.

Naturally we are enthusiastic because we think this machine is exactly what you want. But the proof is always in actual performance. We have been testing it in the field and know it is as good as we say it is.

You'll have to see the new Cupolinor SHM to believe how good it really is. We'll be expecting you at Booth 911 North Exhibit Hall at the convention.

International Minerals & Chemicals

EASTERN CLAY PRODUCTS DEPT.

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

20 NORTH WACKER DRIVE, CHICAGO 6 • PHONE: Financial 6-1800

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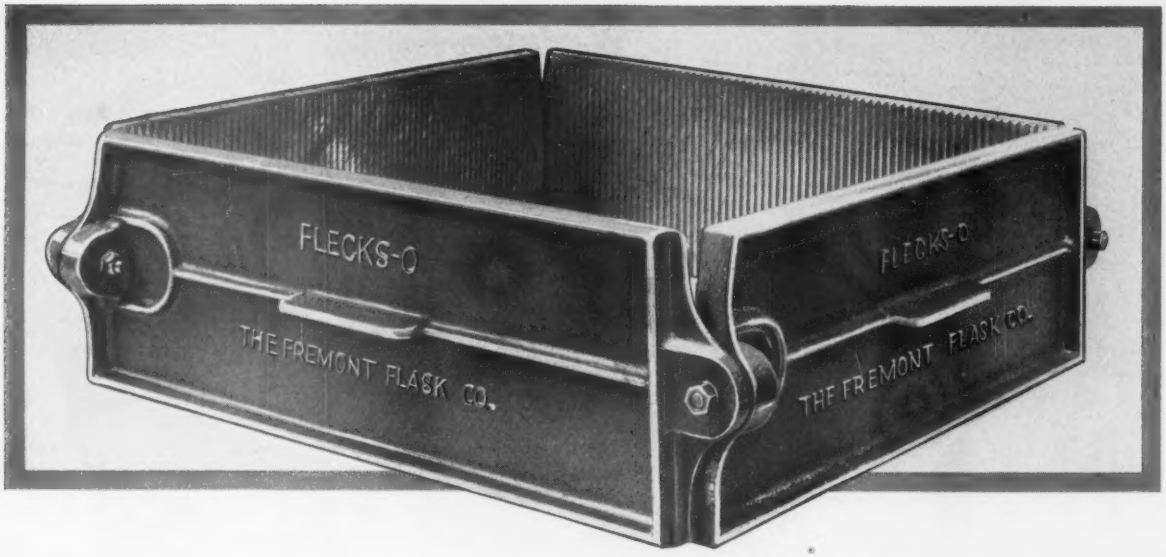


Introducing Fremont's new

"FLECKS-O" Jacket

This new flexible JACKET has been developed to eliminate shifts and runouts.

The "FLECKS-O" will automatically line up with the sides of molds made in flasks assembled on any of the standard tapers. These JACKETS are available either in cast iron or cast aluminum.

The "FLECKS-O" is assembled from 4 castings, so if you have the misfortune to break one of them, you need not scrap the entire JACKET. Completely machined and drilled replacement castings can be furnished at a nominal cost. These can be installed simply by removing 2 nuts.

The FREMONT "FLECKS-O" JACKET will be displayed at the coming AFS Convention in Cleveland, May 12-16, Booth 612, Auditorium Exhibit Hall.

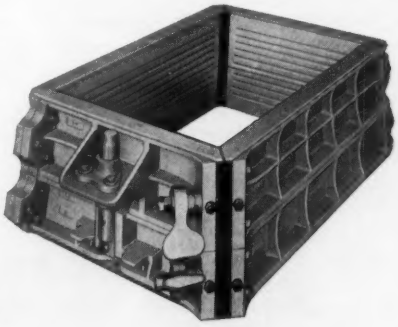
THE FREMONT FLASK CO.

Fremont, Ohio

Fremont's

SPREADLOCK FLASKS

have tremendous corner strength. They are made of magnesium, with cams of hardened steel forgings. Accurately machined to assure exacting work. Look for the entire FREMONT line at the Foundry Show.



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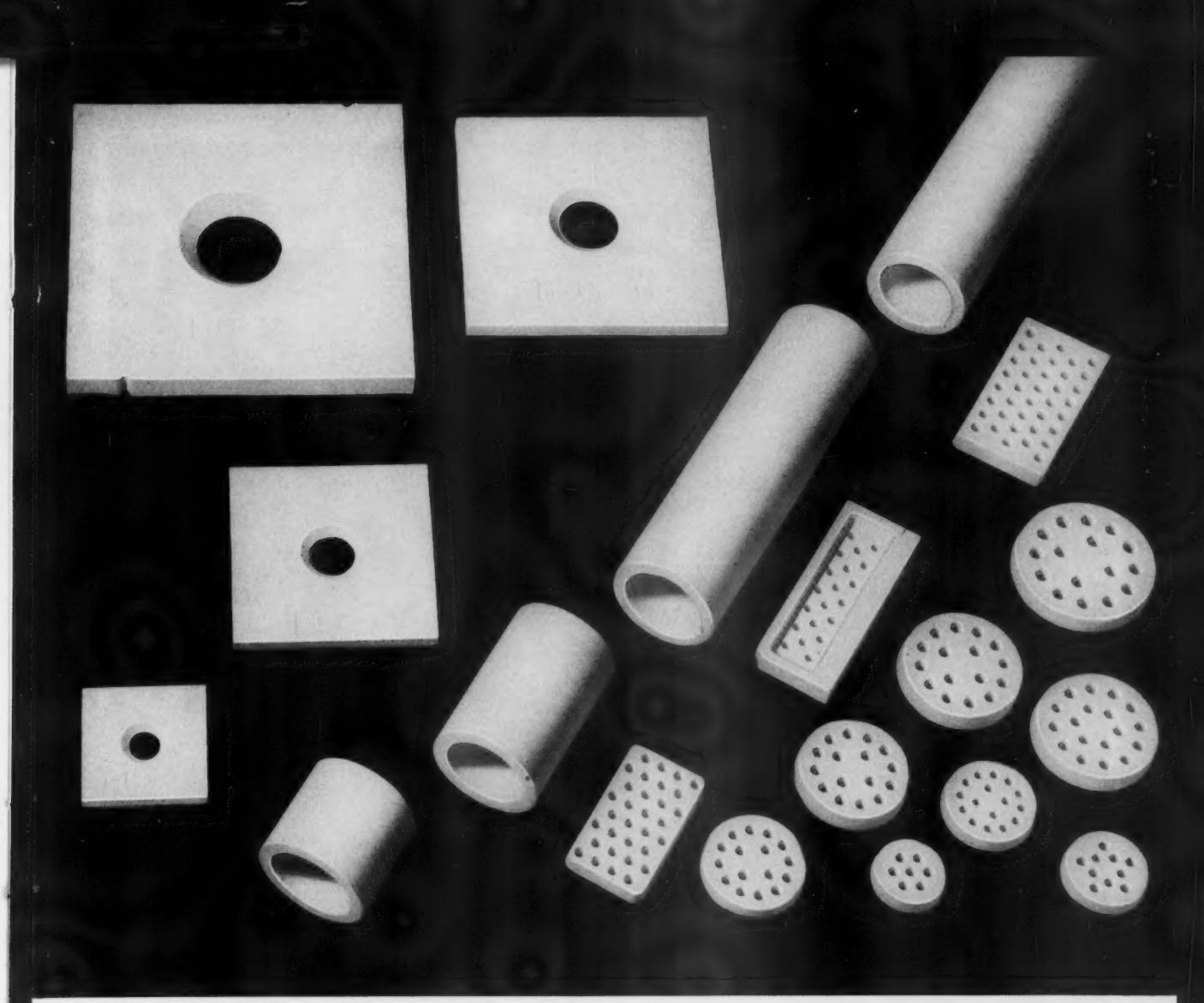

what do **you need** in gating and risering refractories?

There's a good reason why Louthan is making more and more refractories for the foundry field. *Users like them*, like the way they perform on the job, like the cost reductions they make possible.

Louthan Strainer Cores are now available in more sizes and shapes—and for *steel, iron, brass* and *bronze* castings. All provide an accurate choke for positive control of metal flow, eliminate slag and oxide inclusions.

Louthan Breaker Cores facilitate rapid removal of the riser with subsequent labor savings. There is no core gas. You get cleaner castings. Available for all riser diameters from 2″ to 12″, and for use with *any metal casting* risering from a flat surface.

Louthan Gate Tiles prevent erosion of the gates in steel castings. They safely withstand high temperatures, will not react with the molten metal. All popular diameters and lengths can be furnished, also elbows and tees to match.

So again we say, "What do *you* need?" *We have it!* If you haven't used Louthan Refractories, it will pay you to try them.

THE Louthan MANUFACTURING COMPANY

(A SUBSIDIARY OF FERRO CORPORATION) EAST LIVERPOOL, OHIO

REPRESENTATIVES: M. A. BELL COMPANY, St. Louis 2, Mo. . . . Houston 3, Texas; **FOUNDRY SUPPLY COMPANY,** Minneapolis 16, Minn.; **MILWAUKEE CHAPLET & SUPPLY CORP.,** Milwaukee 46, Wisc. . . **FREDERIC B. STEVENS INC.,** Detroit 16, Mich. . . . Indianapolis 7, Ind. . . Buffalo, N. Y.; **MISSOURI REFRACTORIES COMPANY,** 4599 Pacific Blvd., Los Angeles 58, California

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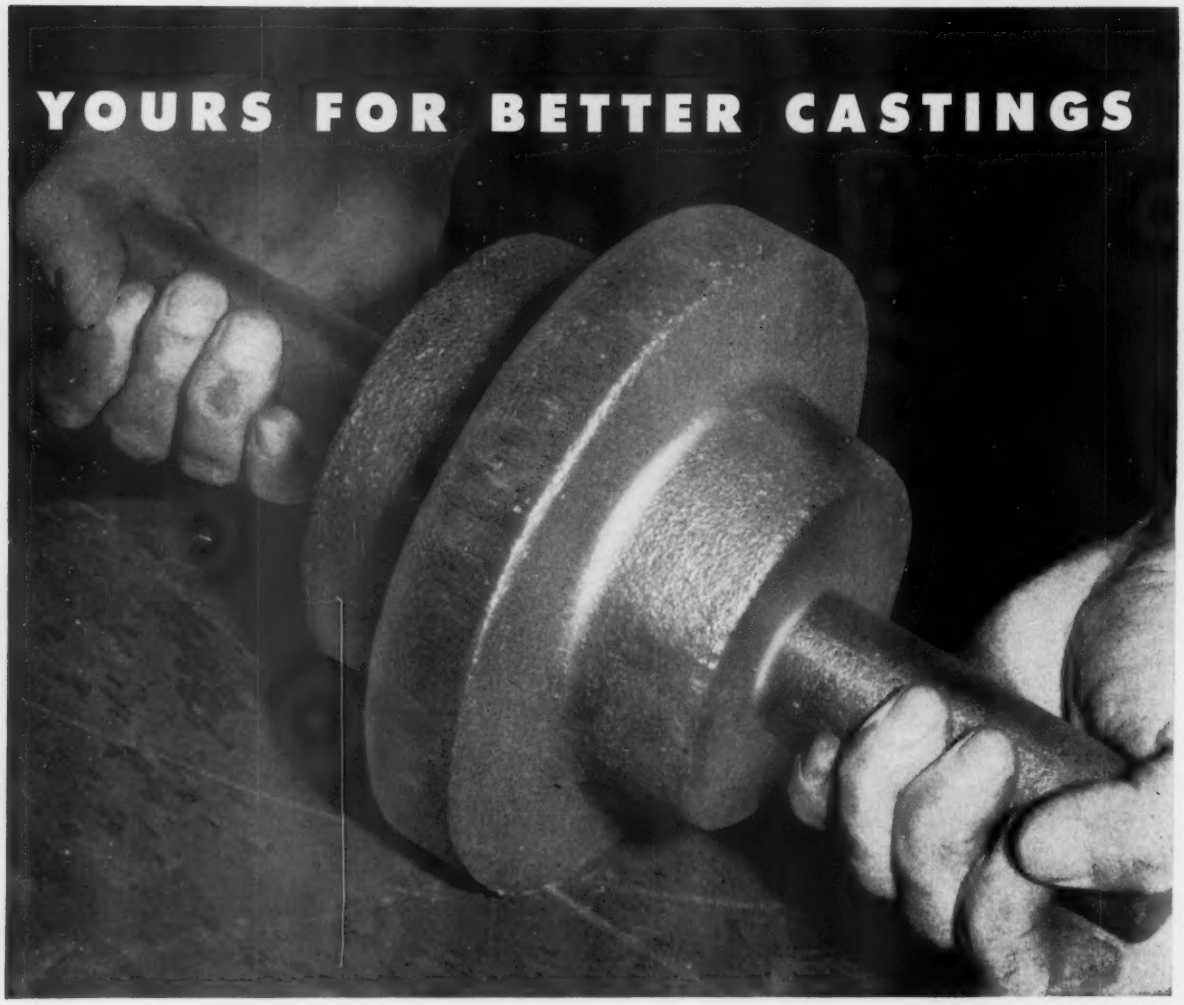


OTTAWA

SILICA SANDS

Serviced by two main trunk railway systems, Ottawa offers fast delivery to all corners of the nation.

99.89% PURE

Laboratory tests prove Ottawa Silica 99.89% pure.

OTTAWA SILICA COMPANY

PLANTS LOCATED IN OTTAWA, ILL. AND ROCKWOOD, MICH.

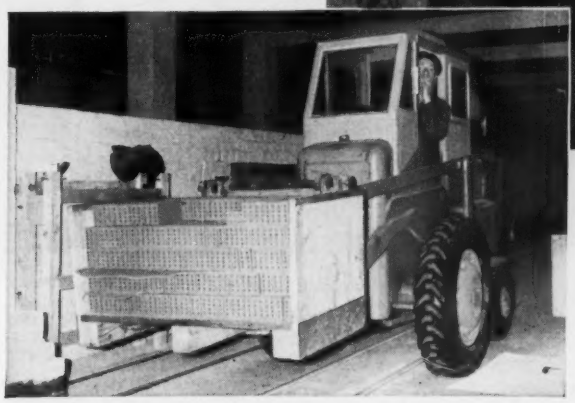
SERVING THE FOUNDRY, GLASS AND CERAMIC INDUSTRIES FOR OVER 50 YEARS

Factory Modernizes Material Handling Methods with FIVE TRACTOLOADERS®

TWO Model TL-6's — each with a ½-cu yd Tip-Back Bucket. (right)

ONE Model TL-6 with a lift fork — interchangeable with bucket. Ideal for transporting materials over unpaved storage area. (below)

TWO Model TL-10's — each with a 1-cu yd Tip-Back Bucket.



In August, 1955, two TRACTOLOADERS went to work for a manufacturer of brick and tile . . . proved their cost-cutting ability so well three more were added. Now five TRACTOLOADERS are used instead of hand labor and side-dump cars to stockpile and transport clay and finished products.

The TRACTOLOADERS have enabled this progressive factory to transfer 16 men to other work. Output in the clay-preparing section has already increased about 25 percent . . . with the loaders only working at partial capacity.

Let your Allis-Chalmers dealer show you how TRACTOLOADERS can modernize your material handling and excavating-loading work. Five models — ½-cu yd to 2¼ heaped capacity.

TRACTO — *a sure sign of modern design*

SOLD AND SERVICED BY YOUR ALLIS-CHALMERS DEALER

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☐ Please send literature
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Name.....

Title.....

Company.....

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City.....State.....

Circle 597 on Page 51

Automatic Sand Handling System for Alcoa Foundry...

DESIGNED
AND
INSTALLED
BY

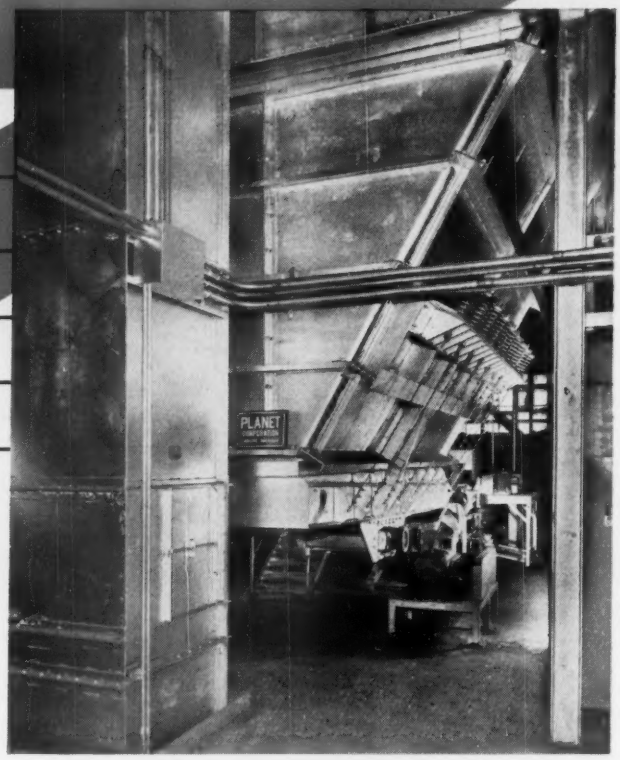
PLANET

In the recently remodeled Alcoa foundry in Cleveland, Planet engineers designed and installed two automatic systems each moving 160 tons of molding sand per hour. As examples of Planet engineering knowhow consider these unusual design features:

1. The two systems are interconnected at four points to provide for cross-switching of sand, emergency maintenance and extra capacity.

2. Special plows, wipers and aprons to handle unusually wet and sticky sand.

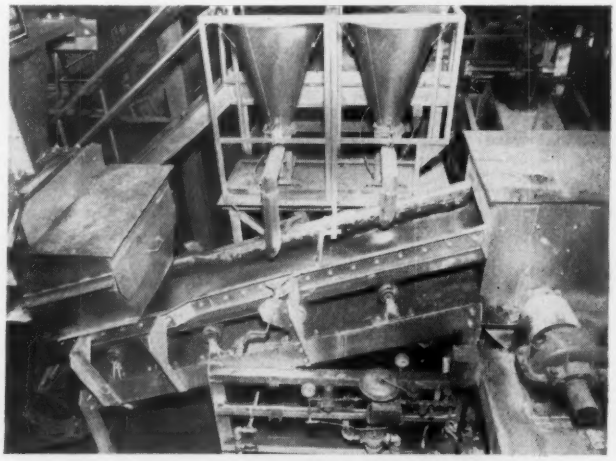
3. Stainless-clad finish on all metal parts that come in contact with sand.



1

200 TON SAND BIN

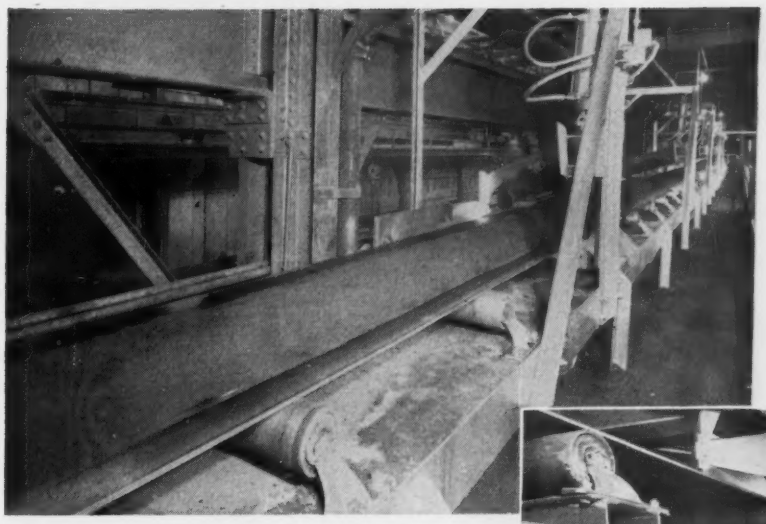
Sand is stored in this bin which has an oscillating type feeder adjustable from 90 to 160 tons per hour. In the left foreground a 200 ton per hour elevator returns sand to the bin.



2

ADDITIVE STATIONS AND TRANSFER CONVEYOR

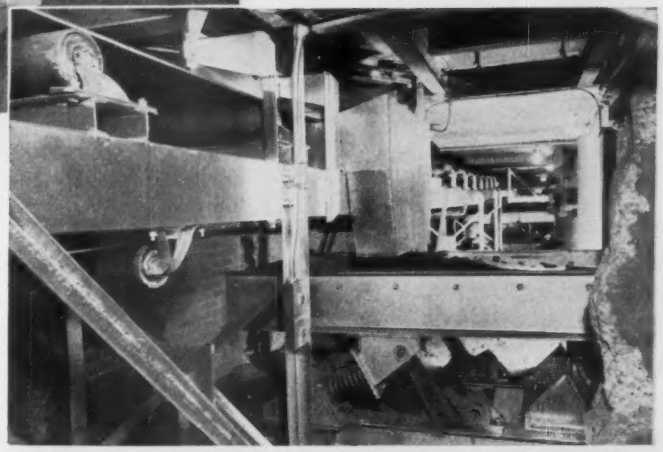
Sand from bin is moved under additive bins to automatic moisture control and muller.



3

SAND DISTRIBUTING BELT

At each molding station automatic controls operate plows which keep molders' hoppers supplied.



UNDERFLOOR SAND RETURN SYSTEM

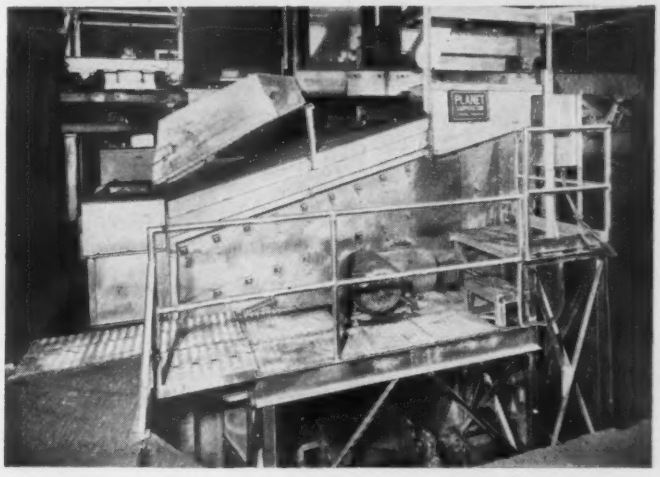
4

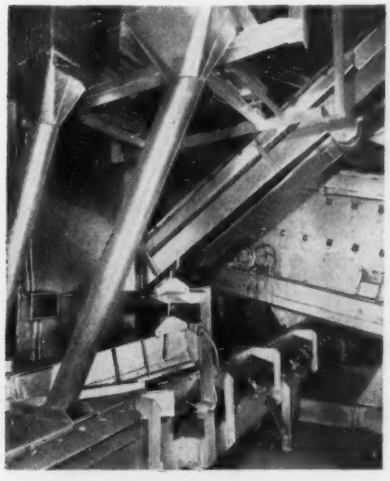
Excess sand from Distributing Belt is returned by belts to oscillating conveyors which also pick up shakeout sand.

SAND SCREENING UNIT

5

At the end of the return conveyor this unit removes ferrous scrap by means of a magnetic separator, and removes non-magnetic scrap by screening. A similar unit screens sand returned by conveyor from the finishing room.





6

NEW SAND ADDITION STATION

As the screened sand is moved to elevators for return to bin, it passes bins which add new sand as required.

You can save money and increase production with Planet foundry automation. Whatever your problems Planet foundry specialists can provide sound answers — write or phone today. There's no obligation.

PLANET CORPORATION

- ENGINEERED HANDLING SYSTEMS
- AUTOMATED EQUIPMENT
- FOUNDRY HANDLING SYSTEMS

1818 SUNSET AVENUE LANSING, MICHIGAN

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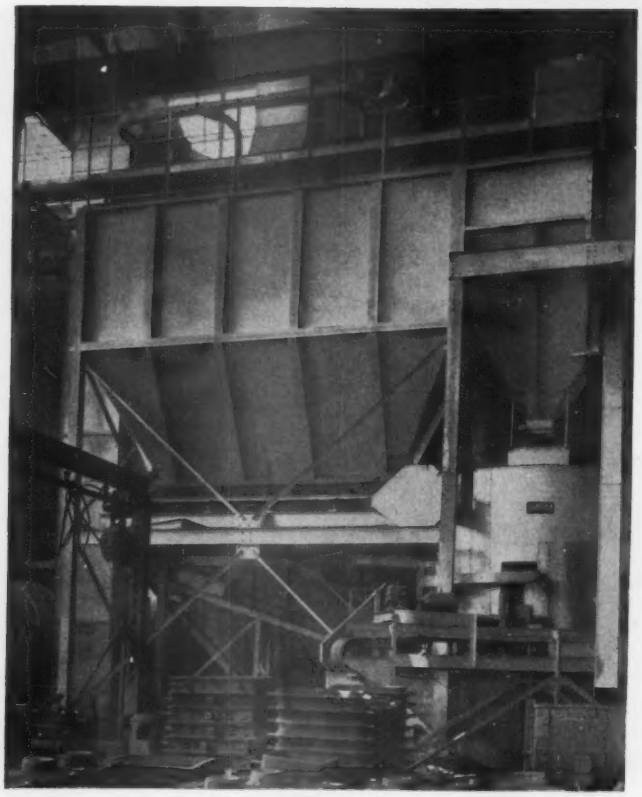
high quality castings need high quality foundry sand . . .



A Clearfield 930 Mixer is the heart of the sand conditioning system in a gray iron foundry.

and
<u>that</u>
calls for a

Clearfield Mixer

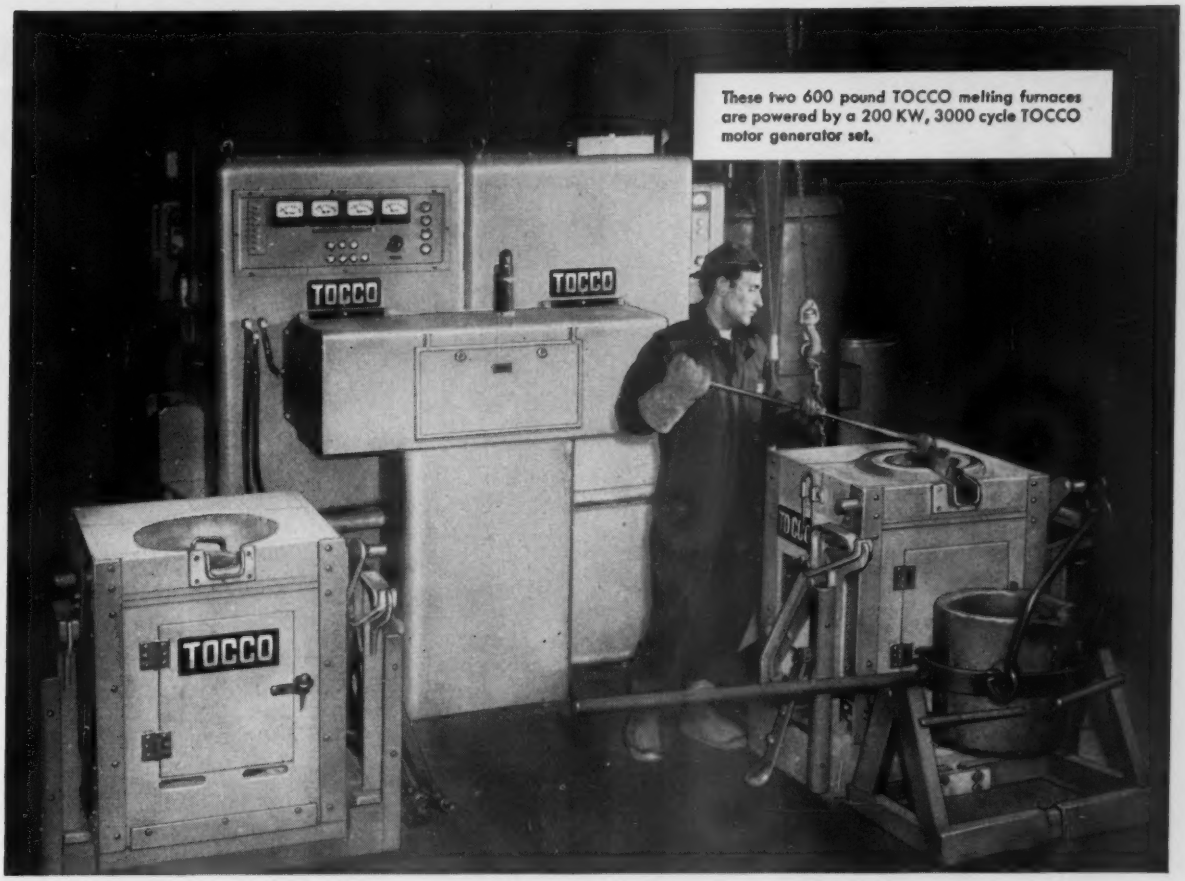
Visit Our Booth
No. 502 at the
American Foundrymens Convention
in Cleveland,
May 19th to 23rd.

A Clearfield Mixer will consistently give you the quantity of sand when you need it, where you need it and with the desired qualities for your particular application. Clearfield Mixers are available in many sizes, to meet every requirement . . . as single units or as part of a sand processing system.

CLEARFIELD MIXER
the choice of industrial leaders

Write today for Catalog No. 83. Get the full information on the tested efficiency of all Clearfield Mixers.

CLEARFIELD MACHINE COMPANY
Clearfield, Pennsylvania, U. S. A.



These two 600 pound TOCCO melting furnaces are powered by a 200 KW, 3000 cycle TOCCO motor generator set.

TOCCO* Induction Melting "Delivers"— In Two Days Instead of Two Months!

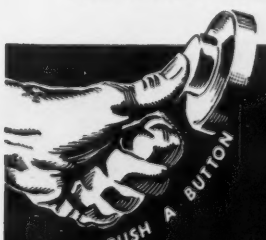
Casting backlogs at Commercial Shearing and Stamping Co. in Youngstown, Ohio used to lag from 8 to 10 weeks behind production schedules. By installing four 300 pound TOCCO melting furnaces this firm upped daily melting capacity to 16,000 pounds. Now orders can be shipped in 48 to 72 hours.

In a foundry occupying less than 5000 square feet of space, production of castings jumped between 40% and 50%; tensile strength of alloy castings was boosted from 35,000 to 50,000 p.s.i. Substantial savings in the cost of castings have resulted. Moreover, with precision casting and molding on a push button basis, many former drilling and roughing operations were completely eliminated.

Many firms have discovered that TOCCO Induction Melting insures maximum quality control, increased volume and lower operating costs.

Look to TOCCO also for *vacuum* melting furnaces of up to *5,000 pounds* capacity.

THE OHIO CRANKSHAFT COMPANY



TOCCO

Trade Mark Reg. U.S. Pat. Off.

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. F-5, Cleveland 5, Ohio

Please send copy of "The Case for TOCCO Induction Melting."

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State____

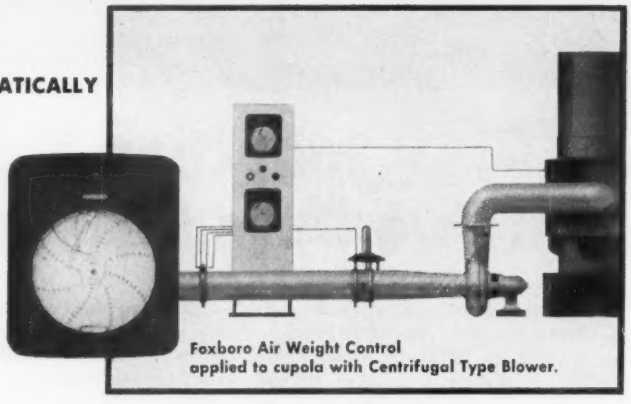
Circle 600 on Page 51

POUR BETTER CASTINGS—AND SAVE

IMPROVE CUPOLA EFFICIENCY — AUTOMATICALLY

. . . with Foxboro Air Weight Controllers

Performance-proved in more than 1500 successful applications! These popular Foxboro Controllers automatically "weigh" air for cupola blast . . . provide right amount of oxygen for best combustion regardless of weather conditions. Results: higher quality castings, greater productivity . . . fuel savings and less pigging. **Write for Bulletin 10-10.**



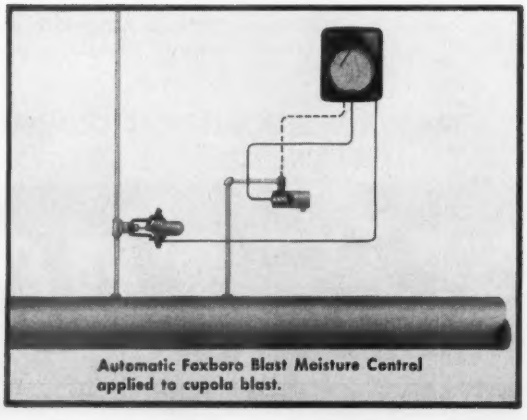
Foxboro Air Weight Control applied to cupola with Centrifugal Type Blower.

CONTROL BLAST MOISTURE — IT PAYS!

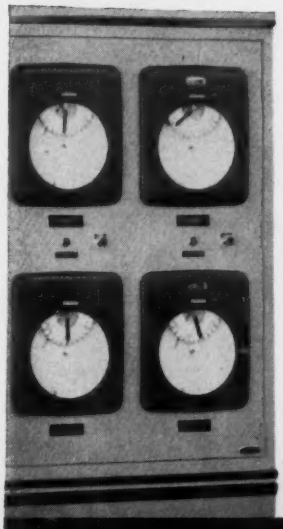
. . . with Foxboro Dew Point Recorders and Controllers

These Foxboro Instruments, with the exclusive Dewcel* measuring element, reduce coke waste and "cold metal" pours. Dew Point Recorders provide a foolproof basis for modifying the formula under varying humidity conditions. Dew Point Controllers automatically compensate for blast moisture variations on long-run heats. **Write for Bulletin 11-11A and Data Sheet 330-1.**

*Reg. U. S. Pat. Off.



Automatic Foxboro Blast Moisture Control applied to cupola blast.



Typical control panel, with complete instrumentation for hot blast cupola operation

FROM CUPOLA BLAST CONTROL to automatic foundry operation, Foxboro-engineered instruments and control systems yield cost savings . . . better castings . . . greater efficiency. Your nearby Foxboro Field Engineer will show you why — and how. Or write us for details on the instruments and control systems shown below. The Foxboro Company, 325 Neponset Ave., Foxboro, Mass., U.S.A.

. . . with Foxboro Complete Foundry Instrumentation

BAKE CORES MORE UNIFORMLY

. . . under Foxboro Core Oven Control

Here's automatic assurance of better, more uniform cores from both batch and continuous type ovens. A wide variety of electric and pneumatic Foxboro Temperature Controllers in recording as well as indicating models, is available for all types of heating systems and ovens. Write for Bulletin 5A-13A.

STOP CUPOLA TROUBLES BEFORE THEY START

. . . with Foxboro Windbox Pressure Recorders

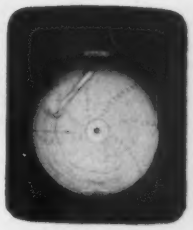
These "trouble-shooting" recorders give operators a continuous record of cupola conditions . . . show up clogged tuyeres, bridging, fine coke sizes, etc. They're dependable, accurate, troublefree performers. Write for Bulletin 6-10B.

OTHER FOXBORO EFFICIENCY BOOSTERS

Blast Pressure Recorders
Automatic Temperature Controllers for Pre-Heaters
Pressure Controllers for Exhaust Systems
Temperature Protection for Fans and Dust Collectors
Temperature Controllers for Auxiliary Start-Up Heaters

"PIN-POINT" CONTROL OF MULTI-ZONE FURNACES

. . . with Foxboro Multi-Record, Multi-Point Temperature Controllers



Each instrument provides electric control of as many as 6 temperature points, recording them on a single round chart! This means top economy for zone type annealing ovens and heat treating furnaces. Write for Bulletin 20-10.

FOXBORO
Reg. U.S. Pat. Off.

COMPLETE FOUNDRY INSTRUMENTATION

Circle 601 on Page 51

Ajax Lo-Veyor combination scalping screen and conveyor used in conjunction with sand reclamation system in new automotive foundry.

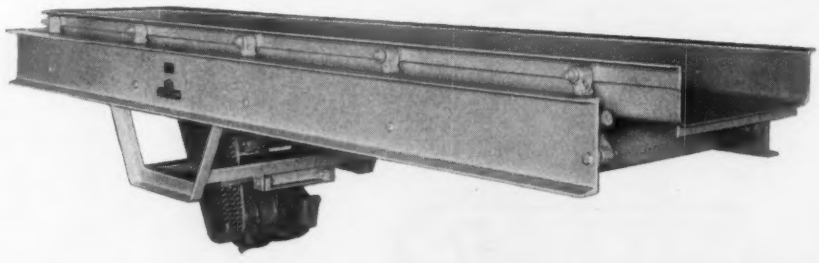
AJAX LO-VEYORS

BUILT INTO MODERN FOUNDRY FLOW CHARTS

Take a trip through modern or modernized foundries and you will see how foundrymen are using Ajax Lo-Veyors to shake out high non-productive sand handling costs Foundry profits are based on tonnage of castings, not tonnage of sand. It is a fact that America's newest foundries are being equipped with Ajax Lo-Veyors from beginning to end.

Today, one of the surest and most economical ways to make substantial savings is to cut sand handling costs. Ajax Lo-Veyors not only convey but separate and screen foundry sand, tramp iron and core wires. Ajax Lo-Veyors are made in a wide range of lengths, widths and capacities to fit every condition. They pay for themselves over and over again in captive and custom foundries, and case histories prove it. Write now for Ajax Lo-Veyor Bulletin 39.

Ajax Lo-Veyors are perfectly simple and simply perfect for foundry conditions. Elimination of exposed bearings reduces maintenance costs particularly under foundry conditions where abrasive sand is constantly encountered. Drive unit is completely enclosed and operates in oil. Take advantage of Ajax specialized but broad experience in designing and building vibrating conveyors for foundry use.



AJAX FLEXIBLE COUPLING CO. INC.

Representatives in Principal Cities

WESTFIELD, N. Y.

TRIM COSTS... INCREASE PRODUCTION with these SMITH PRODUCTS

SMITH L-O CORE OIL
FOR UNIFORM RESULTS

- Produces sound, accurate cores because of uniform high quality and Dow-Therm processing.
- Helps increase core capacity from conventional up to 50% because it responds well to a wide range of oven temperatures.
- Production keeps humming, for L-O cores are tough, yet flexible . . . afford complete collapsibility.
- Helps in all types of casting because there's a selection of 20 grades.

SMITH L-O 45 LIQUID PARTING
FAST ACTING...POWERFUL

- Low-cost, time-proved formulation provides a smooth, uniform coating that permits molding sand to slip free from pattern.
- One application will give perfect results from 5 to 40 molds.
- Ideal for sand-slinger operations as hot sand does not remove parting film.
- Completely seals surfaces against moisture. The result is faster, cleaner operation.
- Its time and work-saving advantages mean increased production at low cost.

SMITH SLUSHOL
TO ARREST RUST

- At low ultimate cost, stored metal parts can be kept free from rust, either indoors or outdoors.
- Provides a tough, tenacious, transparent surface; will not flake or crack off.
- Provides durable protection whether applied by spraying, dipping, or brushing on castings or finished metal parts.
- Easily removed by petroleum solvents.

WAREHOUSE STOCKS AVAILABLE

In the Following Cities

- ALGONQUIN CHEMICAL CO., INC. Hamburg, Pennsylvania
- FOUNDRIES MATERIALS CO. Coldwater, Michigan
- FOUNDRY SERVICE CO. Birmingham, Alabama
- F. F. SHORTSLEEVE Elmira, New York
- PACIFIC GRAPHITE CO., INC. Los Angeles 22, California
- ST. LOUIS COKE & FOUNDRY SUPPLY CO. St. Louis, Missouri
- BRUCE-CONREAUX CO. INC. Indianapolis 7, Indiana
- WESTERN INDUSTRIAL SUPPLY CO. Portland 14, Oregon
- MALCOLM G. STEVENS Arlington, Massachusetts
- OVERSEAS COMMODITIES, LTD. Vancouver, B.C., Canada

SMITH OIL & REFINING CO.

Industrial Oil Division

ROCKFORD, ILLINOIS

Send for Bulletins Today

Circle 603 on Page 51

The sand in the microphoto above speaks quality. It's pure and fine, with the excellent rounded grain properties so desired for foundry use. This is indeed a superb sand —finest for foundries.

The obvious merits of quality can be yours with Wedron Silica

MINES AND MILLS IN THE OTTAWA-WEDRON DISTRICT

WEDRON

SILICA COMPANY

135 S. LaSalle St., Chicago 3, Ill.

99.8% PURE SILICA WEDRON SILICA COMPANY INDUSTRIAL SAND

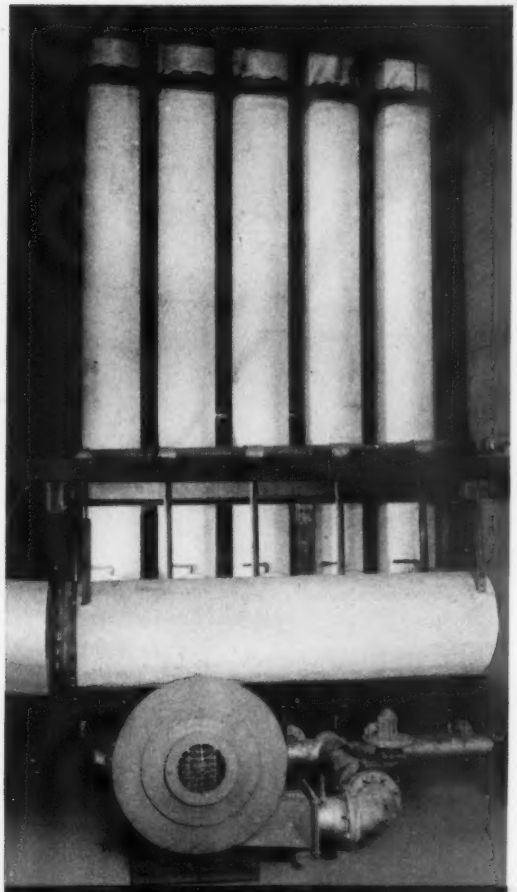
Send for illustrated brochure on Wedron sands.

Circle 604 on Page 51

Circle 605 on Page 51→

NOW HOT BLAST AIR FOR YOUR CUPOLA

500° TO 1200°



W. O. LARSON
Foundry Company
Grafton, Ohio

Cuts Cupola Coke Consumption Up to 30%

"Hot Blast" air preheaters offer dramatic new advantages to the foundry field.

1. **Up to 30% coke savings**
2. **Better control of hot metal temperature**
3. **Silicon oxidation losses reduced**
4. **Improved sulphur control**
5. **More rapid heating**
6. **Increased metal production**
7. **Hotter iron at the mold**
8. **Production of better castings**
9. **Metal charge can be of lower quality**

Get the Facts -

VISIT OUR BOOTH...

 # 1662

AT AFS CONGRESS

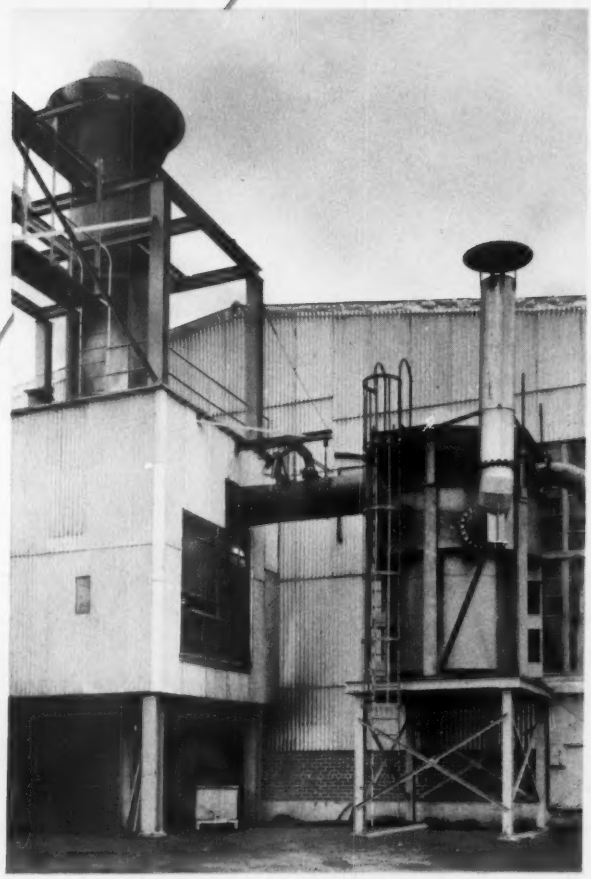
THE BROWN THERMAL DEVELOPMENT CO.

Subsidiary of Brown Fintube Company
Elyria, Ohio

Litho in U.S.A.

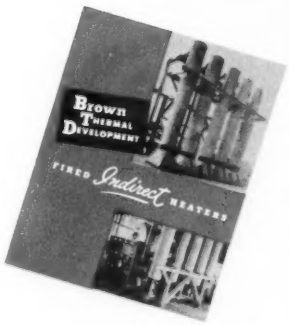
BROWN Thermal Preheaters HOT BLAST AIR

At 1200° F. for James B. Clow & Sons Coshocton, Ohio



In November, 1957, the Brown Thermal Development Company installed a 6,000 cubic foot Hot Blast Preheater at the James B. Clow & Sons Plant, Coshocton, Ohio. This unit is now furnishing hot blast air up to 1200° F. Units like this offer foundries the following advantages:

- A return of up to 30% in coke savings a year is possible.
- Use of Brown's Fintubing application, to increase surface area, which reduces physical size of preheaters and assures higher efficiency.
- Unique counter-flow principle to obtain ultimate in thermal efficiency.
- A completely packaged unit including burners, controls and safety devices.
- Fully automatic for ease of operation.
- Completely instrumentated for accurate temperature control.
- Large capacity (6,000 to 15,000 cfm up to 1200° F.)
- Backed by 20 years of heat transfer engineering.



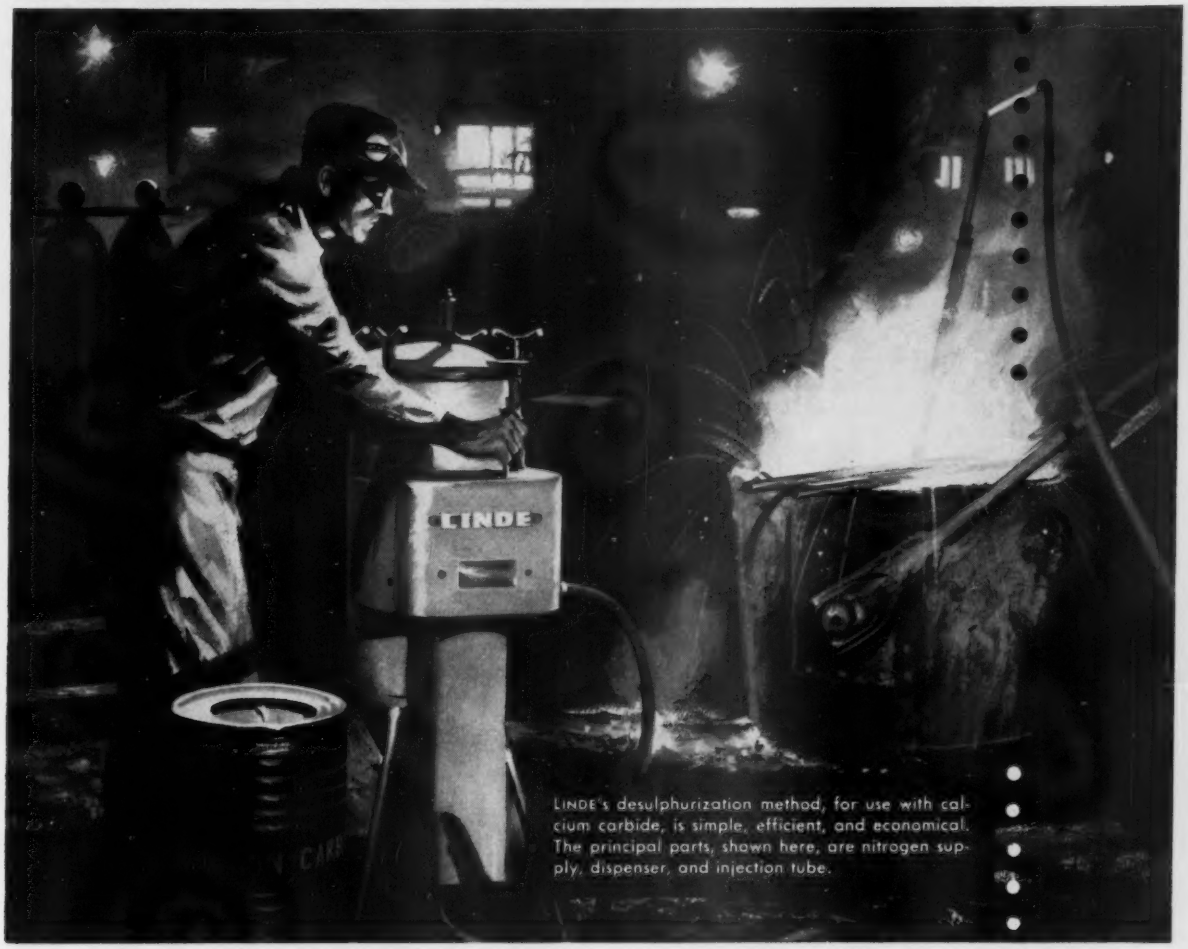
YOURS FOR THE ASKING
Learn how Brown Thermal Hot Blast Heaters can slash coke costs and produce better castings. Write for complimentary copy of Bulletin No. 586.

BROWN THERMAL PREHEATERS

THE BROWN THERMAL DEVELOPMENT CO.

Subsidiary of Brown Fintube Company Elyria, Ohio

DESULPHURIZATION...



LINDE's desulphurization method, for use with calcium carbide, is simple, efficient, and economical. The principal parts, shown here, are nitrogen supply, dispenser, and injection tube.

You get uniform results with Metallurgical Carbide from LINDE·

In the foundry, you can produce high grade iron only by making sure you use metal with a low sulphur content. As a desulphurizing agent, metallurgical calcium carbide assures *uniformity* in the metal you produce. You know in advance that by adding a certain amount of carbide you remove a certain percentage of sulphur. Because metal specifications can be met efficiently and economically with carbide, you eliminate any need for wasteful "trial and error" methods.

Linde's method of mixing UNION calcium carbide and molten iron is simple and sure. A stream of fine mesh carbide and nitrogen under pressure is forced from a dispenser through a hose. The graphite injection tube is immersed deep in the hot metal. The carbide blends evenly and thoroughly with the iron. Desulphurization with UNION calcium carbide creates no fumes, does not attack refractories. The LINDE equipment—nitrogen supply, dispenser, and injection tube—is easy to operate and maintain.

If you would like more information about LINDE's method of desulphurization, using calcium carbide, just call or write your nearest LINDE office. LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in other principal cities. In Canada: Linde Company, Division of Union Carbide Canada Limited.

Linde
TRADE-MARK

UNION CARBIDE

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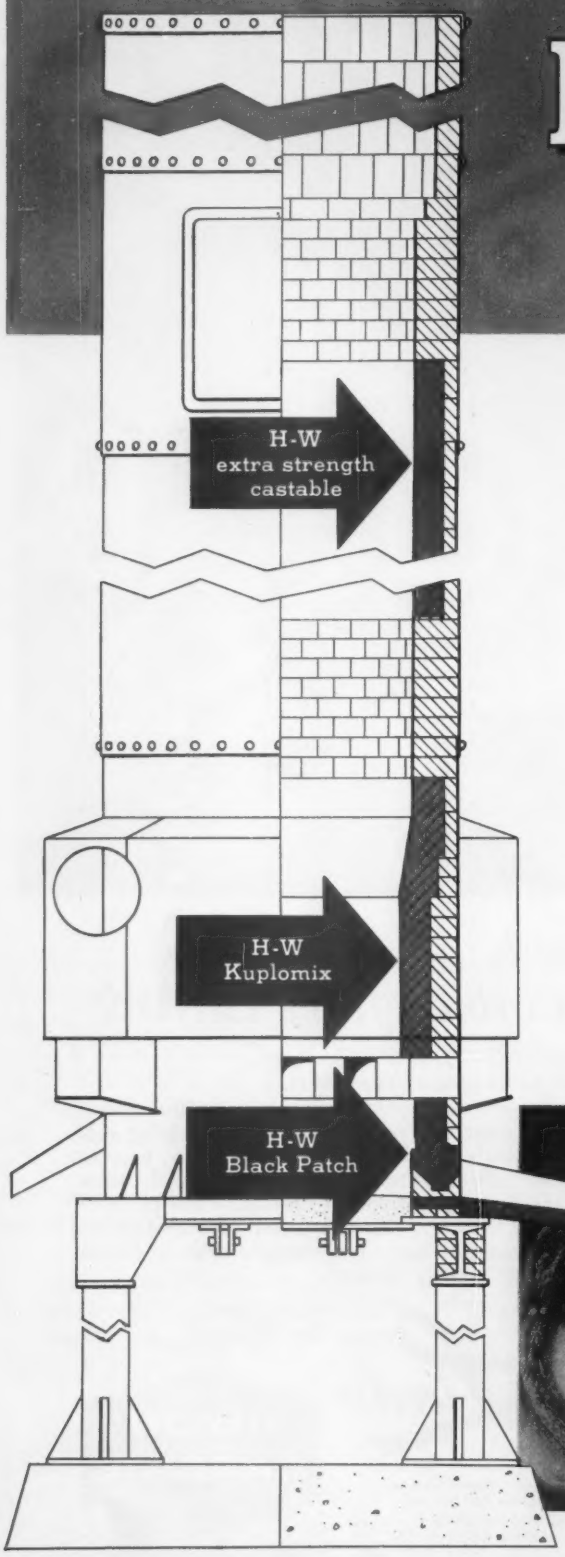
Circle 606 on Page 51

The complete range of Monolithic provides for



for CUPOLAS...

in the charging zone . . .

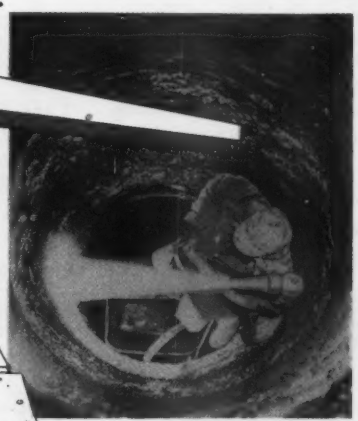
H-W EXTRA STRENGTH CASTABLE makes a hard strong refractory concrete lining which is extremely resistant to impact and abrasion. In refractoriness it is adequate for service at temperatures up to 2400°F.

in the melting zone . . .

H-W KUPLOMIX forms monolithic linings free from vulnerable joints. It is highly siliceous and very resistant to the corrosive action of non-basic slags and to erosion by molten metal and slag. Applied by air-placement guns or by ramming, it forms a strong lining which withstands impact and abrasion to a high degree.

in wells, tap holes and breast walls . . .

H-W BLACK PATCH is a plastic refractory made with super duty quality fire clay and graphite. When heated the monolithic lining formed with H-W BLACK PATCH develops a strong ceramic set and is highly resistant to wetting and penetration by molten iron and slags. Other applications in which H-W BLACK PATCH renders unusual service are for linings of spouts and runners of cupolas and ladles. Preformed shapes also are supplied.



Gunning Kuplomix

HARBISON-WALKER
Refractories
castables
plastics
ramming mixes
all foundry needs

for FURNACES . . .

Harbison-Walker plastic and castable refractories of various kinds most advantageously fulfill many different specific needs.

H-W 56 LIGHTWEIGHT CASTABLE (56 lbs. per cu. ft.) having relatively high strength commensurate with its excellent insulating value serves with very satisfactory results at temperatures up to 2000°F. Various lightweight insulating castables of exceedingly low iron content are furnished for particular controlled atmosphere furnaces.

H-W EXTRA STRENGTH CASTABLE is widely favored for car tops of annealing furnaces and for concrete linings which are required to withstand unavoidable mechanical abuse. It is dense and highly impervious to gases and fumes and yet possesses the property of low spalling tendency.

Furnace lining and car top are of castable refractory materials.

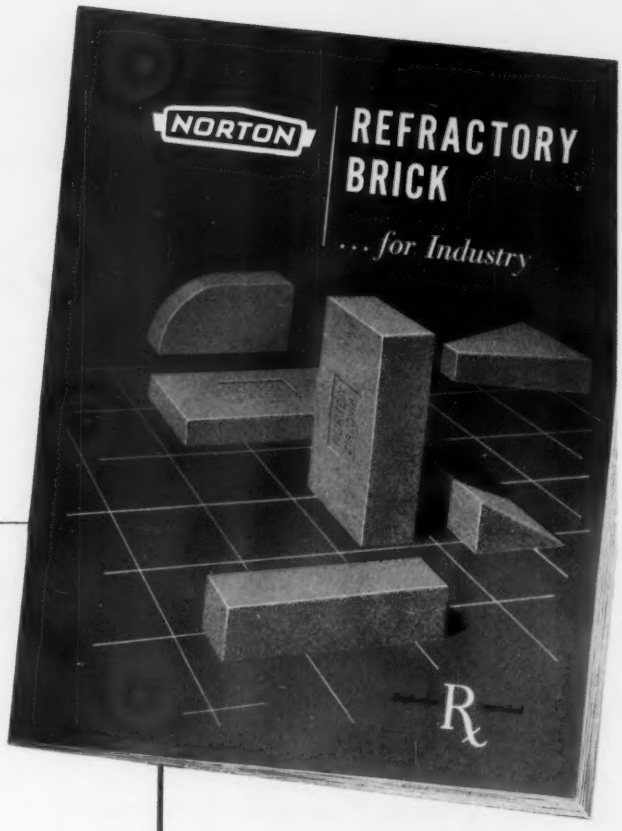
Harbison-Walker products for foundries will be exhibited at Booth 305, Foundry Show, Cleveland, Ohio May 19-23

HARBISON-WALKER REFRACTORIES CO.
and subsidiaries
World's Most Complete Refractories Service
General Offices: Pittsburgh 22, Pennsylvania

Circle 607 on Page 51

Send for this

New Booklet to Help Improve Your High Temperature Processing



Covers Norton refractory brick applications, characteristics, chemical analyses — includes helpful data on materials of construction for temperatures up to 4,400°F.

This new, 24-page Norton booklet can be a dependable guidebook for your selection of the refractories you need to improve production and cut costs in high temperature processing.

Eight Norton-developed refractory materials are covered: ALUNDUM* "T" 87% Alumina; ALUNDUM "A" 99% Alumina; ALUNDUM "L" 99% Insulating Alumina; CRYSTOLON* "G" Silicon Carbide; CRYSTOLON "N" Nitride Bonded Silicon Carbide; MAGNORITE* "K" Fused Magnesia; Zirconia "H" Dense Zirconia; Zirconia "I" Insulating Zirconia.

All essential details are listed, such as: how each material is produced . . . important properties, characteristics and chemical analyses . . . shapes of brick and other molded products that are available . . . representative applications . . . packing methods that assure safe arrival.

Also included are charts and tables of brick shapes and sizes, thermal expansion and conductivity graphs, and a temperature conversion chart.

Norton refractories — engineered and prescribed for the widest range of applications — have helped many users save time and money. The ℞'s described in *"Norton Refractory Brick . . . for Industry"* may do the same for you. Write for your copy to NORTON COMPANY, Refractories Division, 304 New Bond Street, Worcester 6, Massachusetts.

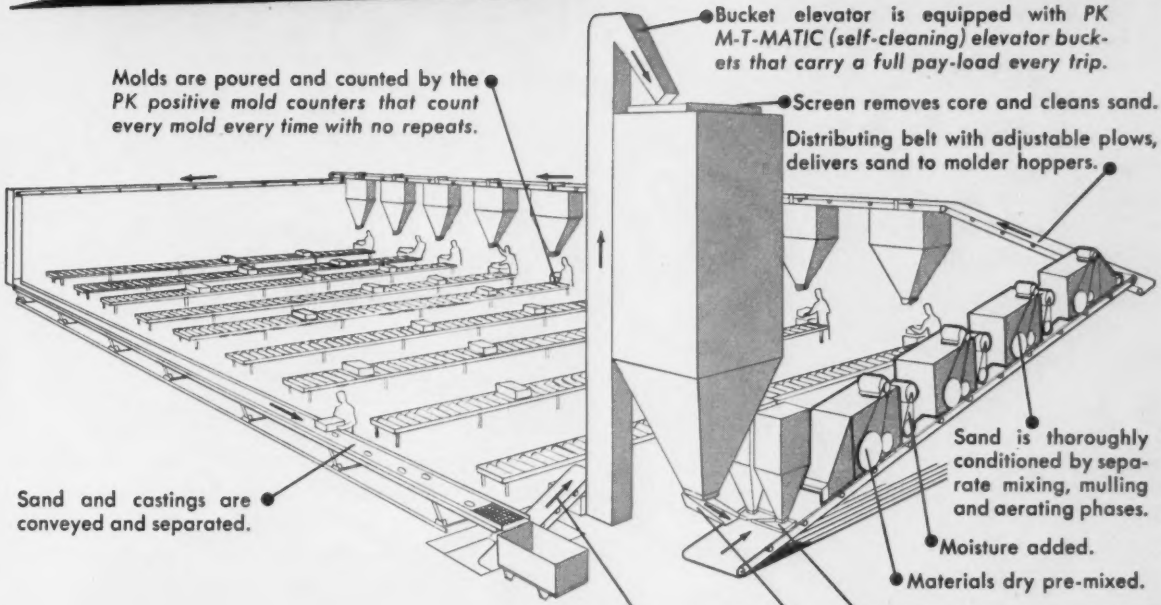
NORTON
REFRACTORIES
Engineered . . . ℞ . . . Prescribed
Making better products . . . to make your products better

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

NORTON PRODUCTS Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals — **BEHR-MANNING DIVISION** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

NOW! A COMPLETE SIMPLE AND EFFICIENT SAND SYSTEM every Foundry can afford!

PLAN FOR THE FUTURE:
INCREASE PRODUCTION AND LOWER UNIT COST WITH *PEKAY* ADVANCED FOUNDRY EQUIPMENT.


Bucket elevator is equipped with PK M-T-MATIC (self-cleaning) elevator buckets that carry a full pay-load every trip.
Molds are poured and counted by the PK positive mold counters that count every mold every time with no repeats.
Screen removes core and cleans sand.
Distributing belt with adjustable plows, delivers sand to molder hoppers.
Sand is thoroughly conditioned by separate mixing, mulling and aerating phases.
Moisture added.
Materials dry pre-mixed.
Bond and new sand added.
Vibrating feeder withdraws storage sand.
Magnetic conveyor belt removes ferrous materials.
Sand and castings are conveyed and separated.

SEE A *PEKAY* SAND SYSTEM IN ACTION

The dependable Pekay Mixer-Mullers have been in operation since 1949 without a single breakdown effecting production stoppage.

Molders Hoppers are coated on inside to prevent scaling and rusting. Molder gates are ball-bearing mounted and air-operated with hand lever in case of air cylinder failure.

BUY THE BEST FOR LESS

HERE'S WHY A *PEKAY* SAND SYSTEM WILL PAY FOR ITSELF IN *ONE* YEAR.

- Less equipment to buy.
- Less equipment to maintain.
- Less horsepower required.
- Less manpower required.
- One small pit excavation.
- One bucket elevator.
- Molders Hoppers always full.

PEKAY MACHINE & ENGINEERING CO. INC.

868 N. SANGAMON STREET — CHICAGO 22, ILLINOIS

Specialists in foundry sand conditioning and handling, slurry systems, engineering and equipment

SEE OUR DISPLAY AT THE* FOUNDRY SHOW *BOOTH NO. 1718—1720

FEATURING:

- A PEKAY SAND SYSTEM WITHOUT CONVENTIONAL ELEVATORS.
- PEKAY COOLERATOR.
- PEKAY M-T-MATIC BUCKETS—BELT AND CHAIN MOUNTED.

Circle 609 on Page 51

The separate load and motor brakes operate simultaneously. Each alone can hold the capacity load. Safe 24-volt push-button control, low headroom, choice of suspensions, and "in-the-air" serviceability are other Load Lifter features. Single and 2-speed models available in 1 to 15 tons.

Control so accurate you can even spot a load on glass — SAFELY!

To demonstrate that the double braking system on the Load Lifter Electric Hoist does stop loads instantly, we set up this "glass test". Time after time, the hoist operator spotted the load on the fragile window glass without breaking it!

Fast, accurate spotting with no drift or backdrop is a must in handling all kinds of loads. Load safety and production economy demand it—the Load Lifter Hoist assures it. While this novel test proves the precision control of the Load Lifter, convince yourself by seeing one doing actual production work. Call your Shaw-Box Distributor and ask him to arrange for a demonstration in a nearby plant. Or, write us for complete details about Load Lifter Wire Rope Electric Hoists.

58FG-2

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

'Load Lifter'® ELECTRIC HOISTS

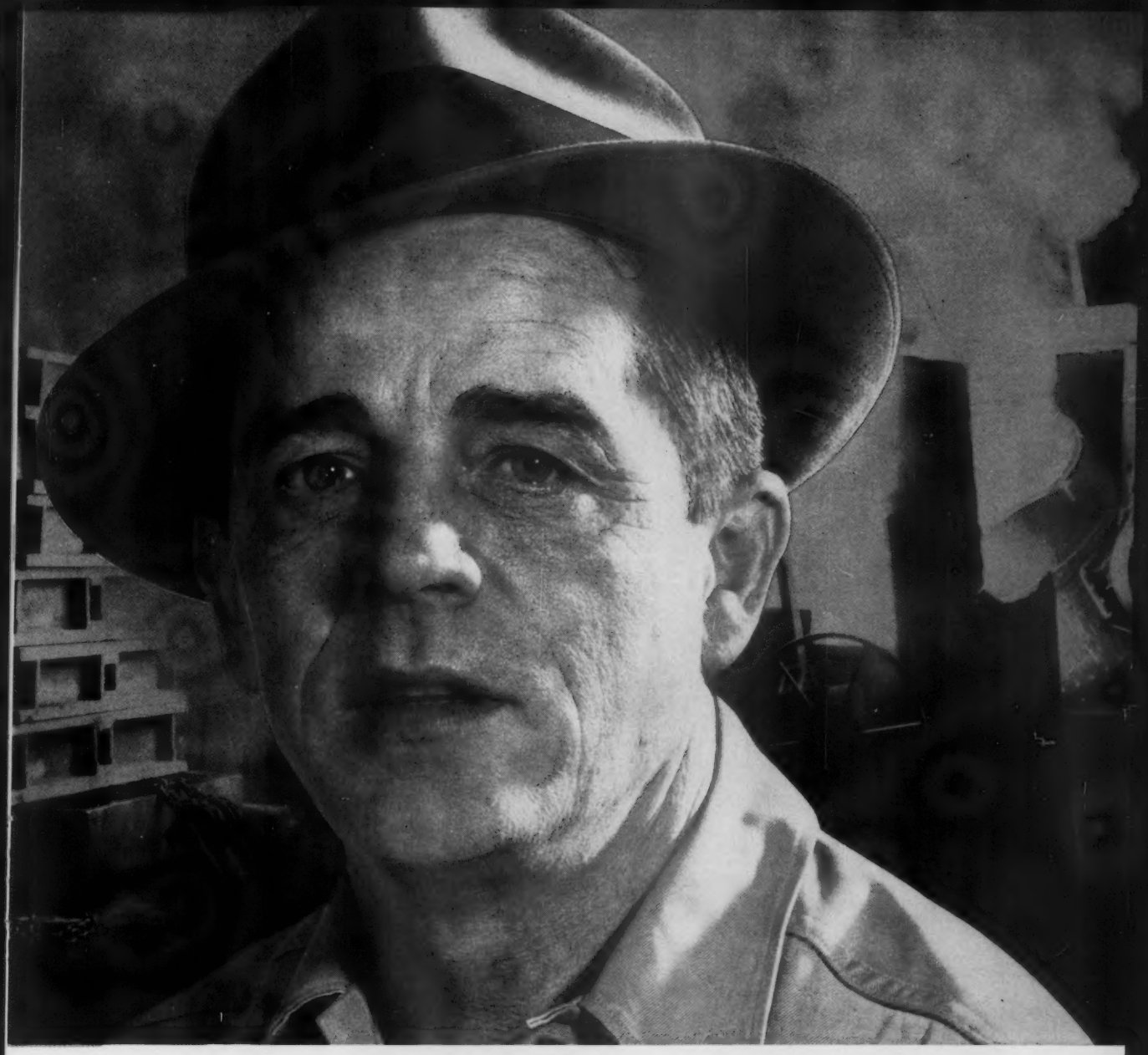
MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION

386 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, and 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments.

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.*



"It's the lowest cost alloy for ductile iron"

Foundries find that ELECTROMET's magnesium-ferrosilicon is an economical, convenient source of magnesium for ductile iron. When added to a suitable composition, the alloy gives maximum ductility by promoting a matrix of soft ferrite. By adjusting the analysis, it can easily be used in high-strength irons having somewhat lower ductility.

Magnesium-ferrosilicon is available in grades with or without cerium. Cerium (0.5 or 2%) helps control unwanted residual elements which hinder the formation of spheroidal graphite. For further information and technical assistance, contact your ELECTROMET representative.

ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

Write for the folder, "Magnesium-Ferrosilicon for Ductile Iron."

Electromet

FERRO-ALLOYS AND METALS

UNION CARBIDE

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Circle 611 on Page 51

These eight reasons are based upon product availability, selection, and service.

First, as the only producer of both Northern and Southern Irons, Republic offers you the only complete line of all grades of merchant pig iron available in the industry. Northern grades include Malleable, Bessemer, Foundry, and Basic—plus Chateaugay, Republic's exclusive Low Phosphorus Pig Iron. Southern furnaces produce Foundry and Basic Irons.

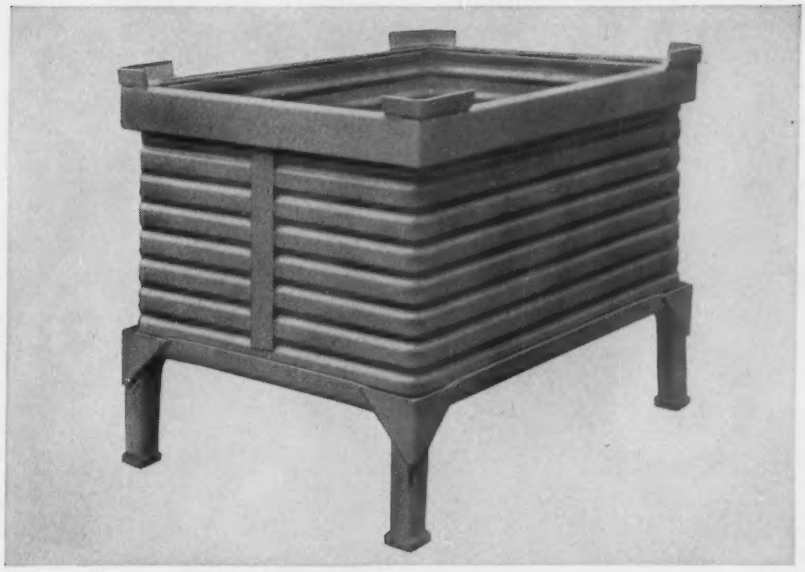
Then, to assist you in selection, application, processing, and use, Republic provides expert metallurgical service. The Republic Pig Iron Metallurgists are both foundrymen and skilled technicians. They have a solid industry background gained from years of actual foundry experience. They know all types of irons and their characteristics. And, they talk a language you can understand—your language.

Republic Pig Iron Metallurgists have at their fingertips information on the latest processes and techniques available for improving castings, and expanding their use and sale.

Frequently, these men are called upon to make routine foundry surveys. Their recommendations and suggestions often result in improved operations, increased production efficiency, and output at lower unit cost. Even a seemingly minor change in operation or procedure has resulted in recapturing business lost to other methods of fabrication.

And, because Republic is the only producer of all grades of merchant pig iron, the metallurgists are able to recommend the proper grade for your specific job without hesitation or prejudice.

Seven grades of pig iron, plus prompt, expert metallurgical service add up to eight good reasons for relying upon Republic for all of your requirements. Mail the coupon for more information on Republic's complete line of irons, or for metallurgical service.



THIS STEEL "HOT" BOX MEETS ALL REQUIREMENTS for handling hot work in foundries. It is made of Republic High Strength Steel and is designed to withstand plenty of use and abuse. The box is 53" long x 38" wide x 26" deep. Corrugated-steel construction of the sides and bottom assures long service life at lowest per-year-cost. Stacking brackets are securely welded to the top corners of each box permitting tiering to any practical height. 16-inch clearance is provided for easy handling by fork lift truck. Send coupon for catalog on the complete line of Republic Materials Handling Equipment.

REPUBLIC STEEL LOCKERS MEET ALL REQUIREMENTS for on-the-job protection of employee valuables and personal belongings. They provide full inside-locker roominess, sanitation, safety. Republic Steel Lockers combine smart styling and design with simple construction for fast, easy installation. The Bonderized finish is locked on . . . rust is locked out. Maintenance costs are held to an absolute minimum. Available in many types and sizes for every industrial plant. Republic's Berger Division offers complete planning and installation service. Send coupon today for more information.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. FO-5505
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

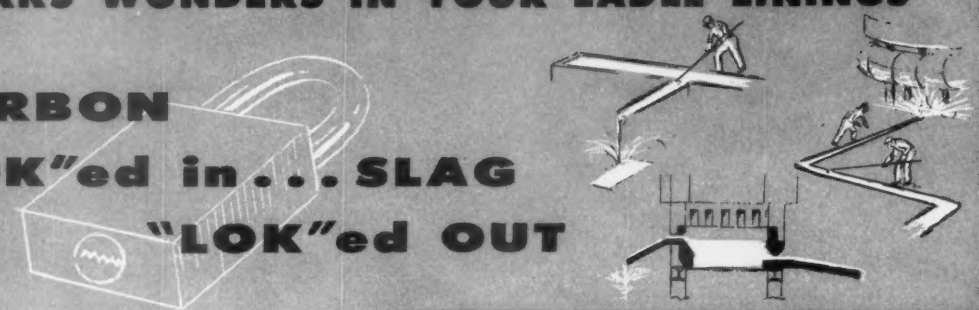
☐ Have a Pig Iron Metallurgist call.
Send more information on:
☐ Chateaugay ☐ Northern Pig Irons
☐ Southern Pig Irons
☐ Materials Handling Equipment ☐ Lockers

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____

WALSH GRAFLOK PLASTIC

WORKS WONDERS IN YOUR LADLE LININGS

CARBON "LOK"ed in . . . SLAG "LOK"ed OUT



Meets Today's Demand For Increased Service Life At Lower Cost

Slashing refractories cost per ton of metal melted is the feat performed by this dense, plastic, graphite refactory. By "LOK"ing out the destructive effects of metal oxides and slags, you are assured of easier flow of metal, reduced wear on lining, less slag adherence, easier removal, cleaner castings. And Graflok Plastic is noted for its excellent tensile strength for easier handling and workability that saves you time, money and labor.

In 100 lb. waterproof cartons, sliced, ready for use. Also dry form in 100 lb. waterproof bags.

USE GRAFLOK FOR LINING . . .

Receiving and Mixing Ladles

Bull Ladles, Hand Ladles

Open Hearth Bifurcated Spouts, Electric Furnace Spouts, Cupola Front Slagging Spouts, Spouts of Cupolas and Malleable Iron Furnaces

Tap Holes, Slag Holes and Cupola Wells

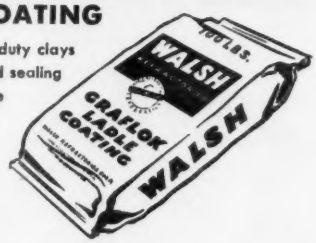
Nozzle Wells of Bottom Pour Ladles

Hot Metal Troughs and Blast Furnace Runners

Breast Packing for Non Ferrous Reverberatory Furnaces

GRAFLOK LADLE COATING

A finely grain sized mixture of super duty clays and graphite. Excellent spreading and sealing properties. For use as a wash or paste coating in any type of refractory ladle lining. Seals cracks, fills pores, produces smooth surface and denser lining. In 100 lb. bags.



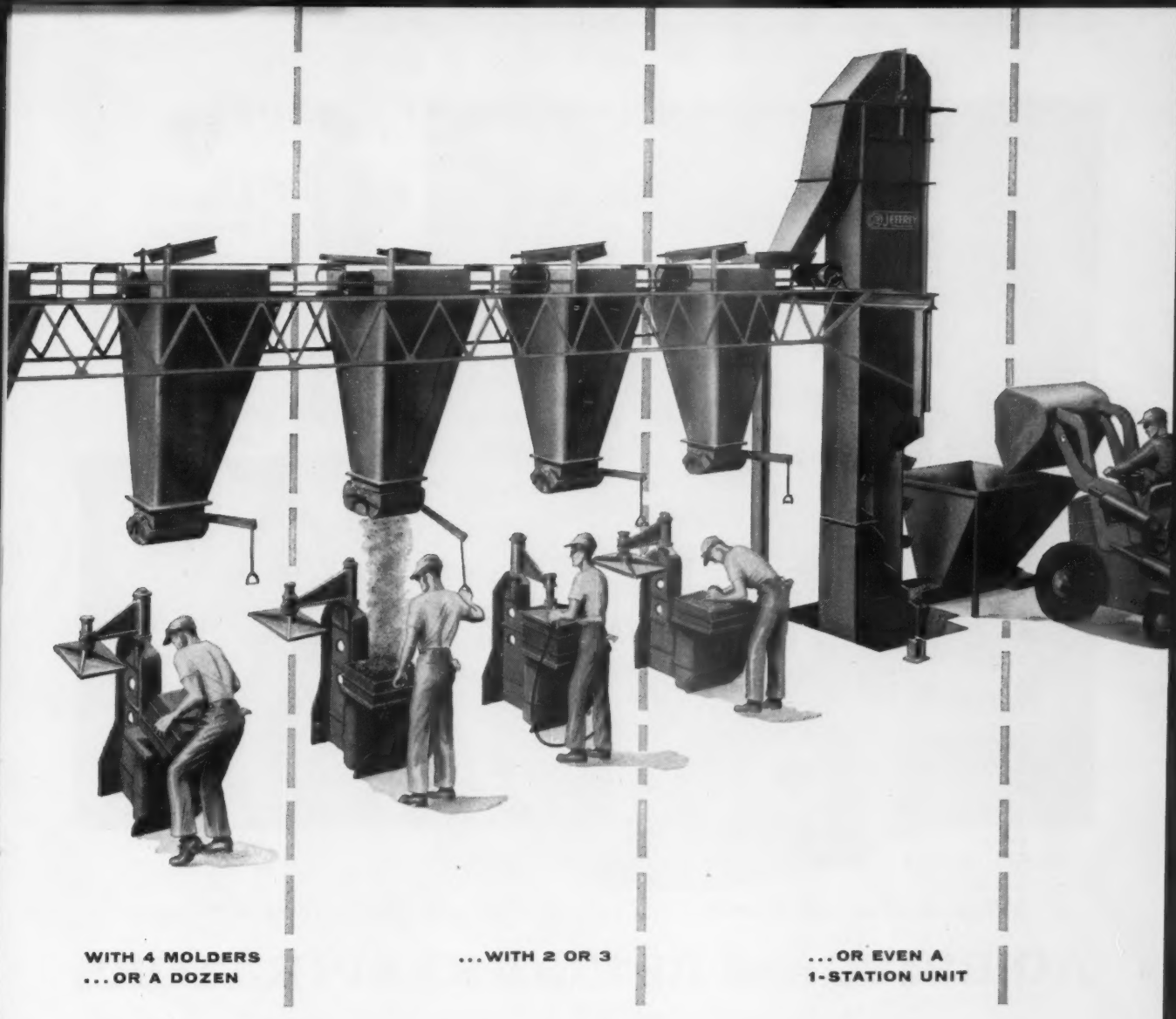
Complete details in new Graflok bulletin, G-58. Write for copy.

WALSH REFRACTORIES CORPORATION — America's Best Clays

WALSH REFRACTORIES CORPORATION

101 FERRY STREET • ST. LOUIS 7, MISSOURI

SPECIALISTS IN REFRACTORIES OF HIGH BULK DENSITY AND LOW POROSITY



WITH 4 MOLDERS
...OR A DOZEN

...WITH 2 OR 3

...OR EVEN A
1-STATION UNIT

Speeds production...cuts molding costs

JEFFREY OVERHEAD SAND SYSTEM

Here's automation which can be *profitably* applied to small foundries as well as big ones . . . the low-cost, easy-to-install Jeffrey overhead sand system. Whether you have a single molding station or a dozen, it will speed production and reduce your molding costs.

Sand is always available at the molding machine and it doesn't have to be lifted from the floor. Molders' time is saved, their work made easier when sand flows directly from overhead hoppers into the flasks.

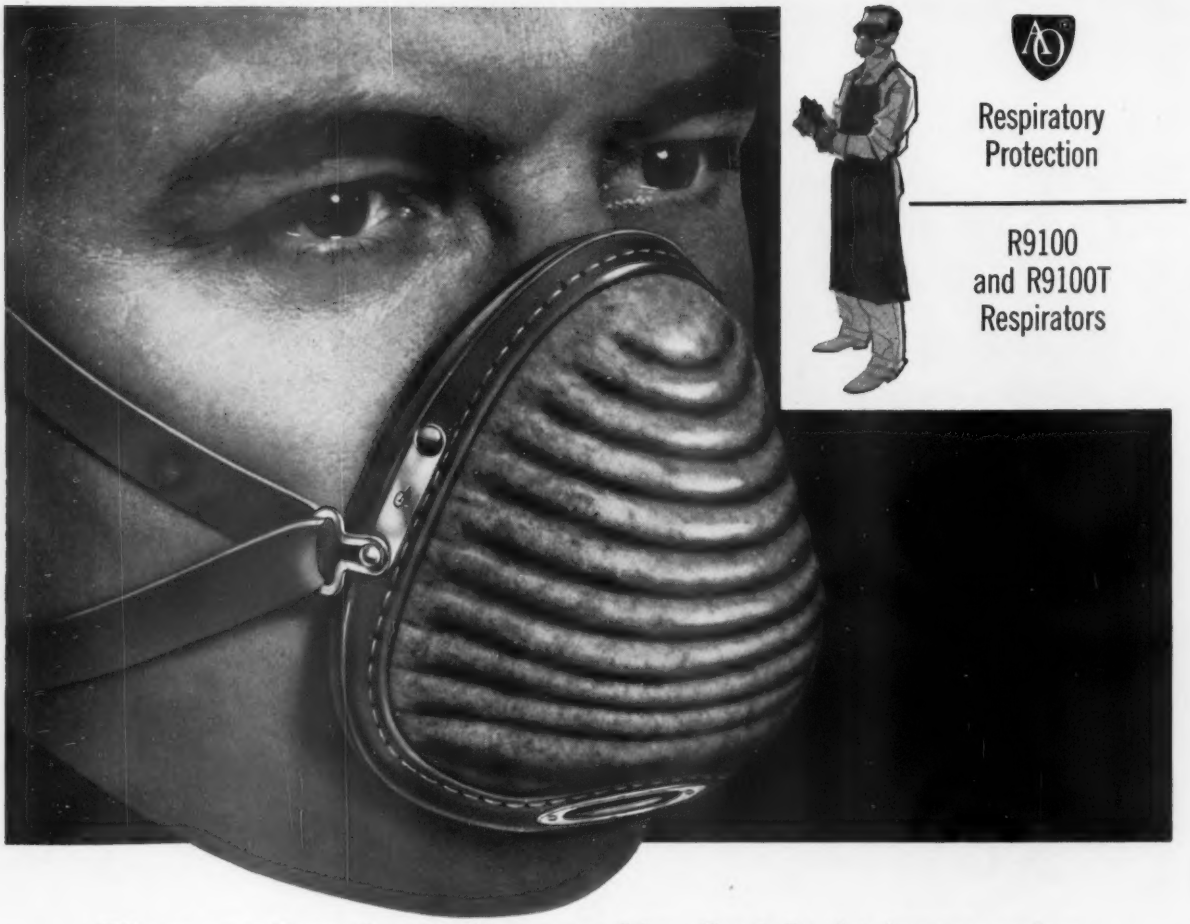
These Jeffrey overhead sand units were designed to bring big-foundry advantages to small foundries . . . at low cost. Built as package units, savings in engineering and manufacturing costs are passed along to you. For complete information, get in touch with The Jeffrey Manufacturing Company, 907 North Fourth Street, Columbus 16, Ohio.

See our exhibit—Booths 2036-8 at the Foundry Show

JEFFREY

CONVEYING • PROCESSING • MINING
EQUIPMENT...TRANSMISSION MACHINERY
...CONTRACT MANUFACTURING

Circle 614 on Page 51



Respiratory Protection

R9100 and R9100T Respirators

Warm weather ahead! Give your Men Cool, Light, Inexpensive

AO R9100 and R9100T RESPIRATORS

Bureau of Mines Approved Dust Protection

When the mercury climbs . . . on hot jobs, workers are grateful for these lightweight comfortable respirators. Small, compact, they weigh only 2 ounces — cover little of the face. Every respirator is individually tested before shipment for compliance with Bureau of Mines requirements (BM approval 2137). Your nearest AO Safety Products Representative can supply you.

QUICK FACTS

- No excess metal — wire frame minimum size
- Face cushion light molded rubber — KNITTED COTTON FACE COVERS AVAILABLE FOR ADDED COMFORT
- Light corrugated felt filter
- Easy to breathe thru — non-sticking, low-resistance exhalation valve
- Double rubber headband
- Easily cleaned — just shake or slap

RECOMMENDED USES:

R9100 — For pneumoconiosis-producing and nuisance dusts such as borax, carbon, glass, grain, graphite, cement, limestone, gypsum, coke, charcoal, wood, flour, aluminum. Bureau of Mines approval 2137.

R9100T — For toxic dusts not appreciably more toxic than lead; such as arsenate of lead, barium, cadmium and manganese. Bureau of Mines approval 2144.

NOTE: AO Sweatbands keep workers cooler, more comfortable, more efficient and safer (sweat can't wash foreign matter into eyes). Keep a supply of sweatbands on hand.

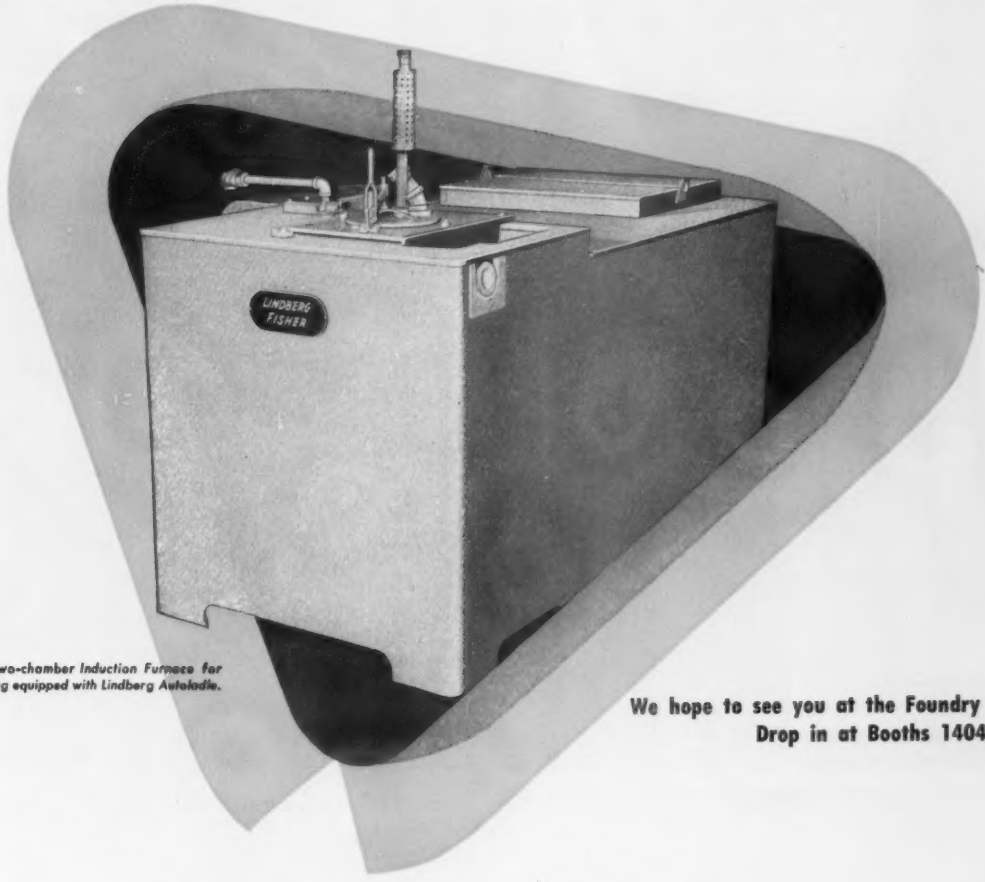
American Optical COMPANY
SAFETY PRODUCTS DIVISION

Always insist on AO Trademarked Safety Products

SOUTHBRIDGE, MASSACHUSETTS
Branches in Principal Cities

1833-1958 • 125 LEADERSHIP YEARS

Here's the ideal combination for casting aluminum automatically

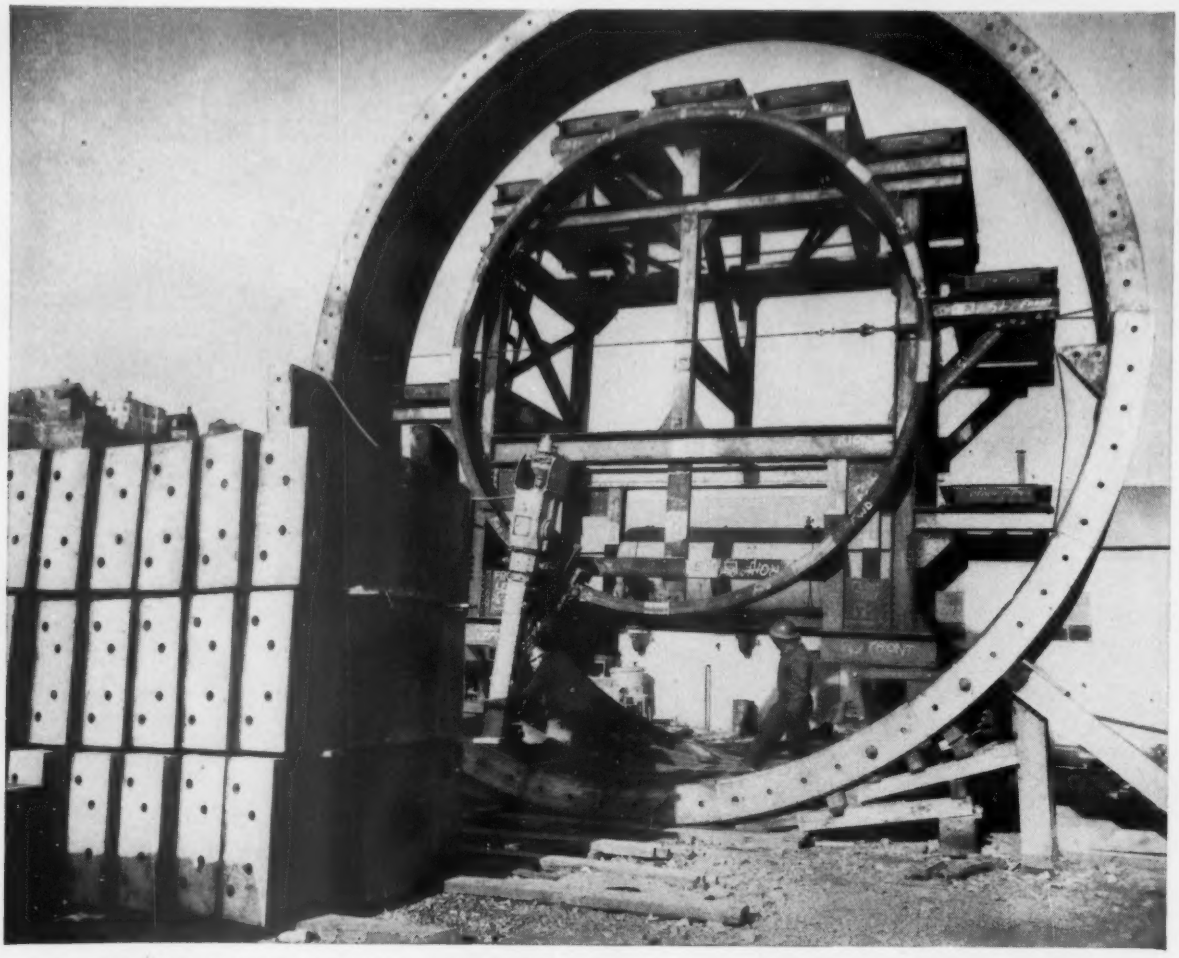


Lindberg-Fisher two-chamber Induction Furnace for melting and holding equipped with Lindberg Autoladle.

We hope to see you at the Foundry Show. Drop in at Booths 1404-1521.

Do you die-cast aluminum? Then take Lindberg's famous two-chamber induction melting and holding furnace, add "Little Joe" Lindberg's new automatic pump, and you'll have the most efficient automatic combination anywhere. The Lindberg-Fisher two-chamber furnace *melts* in one chamber, *holds* metal at precisely the right temperature in the other chamber, and "Little Joe" automatically delivers exactly the right size shot to the casting machine. With this combination all handling of molten metal is eliminated, perfect control of metal temperatures and shot size is maintained, and all automatically. For safer, more economical, more precise handling of aluminum or any non-ferrous metals or alloys better see Lindberg. Just get in touch with the Lindberg plant or the Lindberg Field Representative in your locality, or write Lindberg-Fisher Division, Lindberg Engineering Company, 2453 West Hubbard St., Chicago 12, Illinois. Los Angeles Plant: 11937 S. Regentview Ave., at Downey, California.

LINDBERG heat for industry



CASTINGS TO KEEP TRAFFIC MOVING SMOOTHLY—Giant castings, such as these used in highway tunnels, are another example of how the foundry industry contributes to progress.

TRULINE® BINDER ENDS FOUNDRY TRAFFIC JAMS

Foundries can't afford traffic jams. That's where Truline comes in—helping to keep castings moving on schedule and preventing oven bottlenecks.

In the core room, in the oven, in the cleaning room, Truline Binder avoids delays every step of the way. For example, Truline's quick bake often makes it possible for one oven to do the work of two. Cores bonded with Truline collapse readily; are easily removed by hydroblast or knockout.

To learn more about how Truline can help keep your foundry on schedule, write for full information.

HERCULES

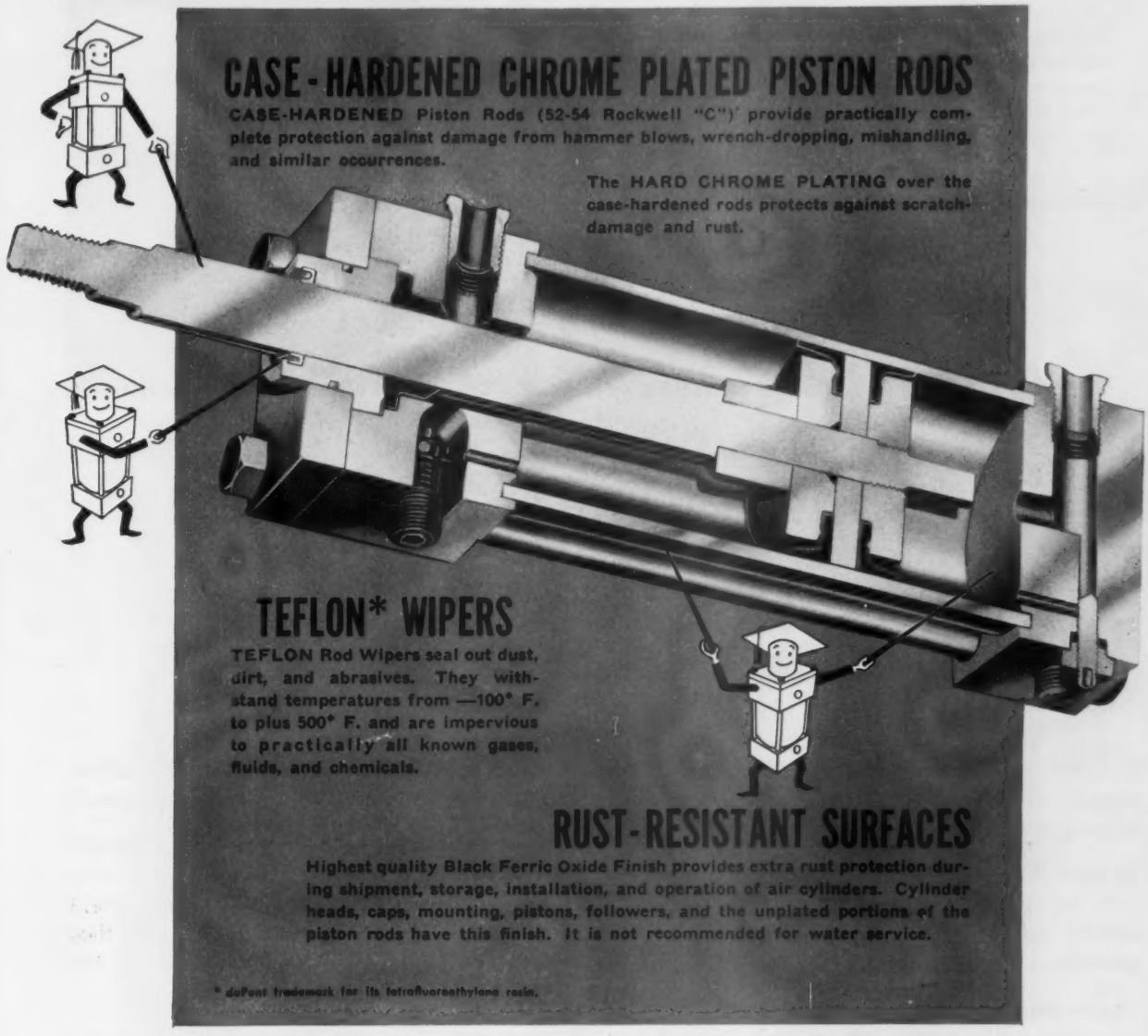
Naval Stores Department
HERCULES POWDER COMPANY
INCORPORATED
900 Market Street, Wilmington 99, Delaware

NF58-1

At No Extra Cost . . .

AIR CYLINDERS

with EXTRA QUALITY Features!



CASE-HARDENED CHROME PLATED PISTON RODS

CASE-HARDENED Piston Rods (52-54 Rockwell "C") provide practically complete protection against damage from hammer blows, wrench-dropping, mishandling, and similar occurrences.

The **HARD CHROME PLATING** over the case-hardened rods protects against scratch-damage and rust.

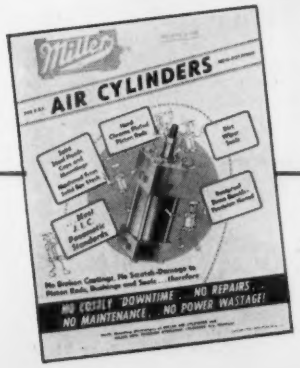
TEFLON* WIPERS

TEFLON Rod Wipers seal out dust, dirt, and abrasives. They withstand temperatures from —100° F. to plus 500° F. and are impervious to practically all known gases, fluids, and chemicals.

RUST-RESISTANT SURFACES

Highest quality Black Ferric Oxide Finish provides extra rust protection during shipment, storage, installation, and operation of air cylinders. Cylinder heads, caps, mounting, pistons, followers, and the unplated portions of the piston rods have this finish. It is not recommended for water service.

* duPont trademark for its tetrafluoroethylene resin.


Miller
AIR CYLINDERS
Hard Chrome Plated Piston Rods
Rod Wiper Seals
Integral Rear Cushion Bumper Gland
Heat Treated Case Hard Steel Barrel
Heat Treated Alloy Steel Piston
Meet A.I.C. Pneumatic Standards
No Broken Castings, No Scratch-Damage to Piston Rods, Bushings and Seals therefore
NO COSTLY DOWNTIME . . . NO REPAIRS . . .
NO MAINTENANCE . . . NO POWER WASTAGE!

Other Standard Miller Quality Features include: bar stock steel heads, caps, and mountings; rust-resistant brass barrels; self-regulating, wear-compensating piston rod seals that never require adjustment; space-saving square design; and other features as shown in Bulletin A-105 sent free on request.

Visit Our Booth at Foundry Show, May 19-23, Cleveland

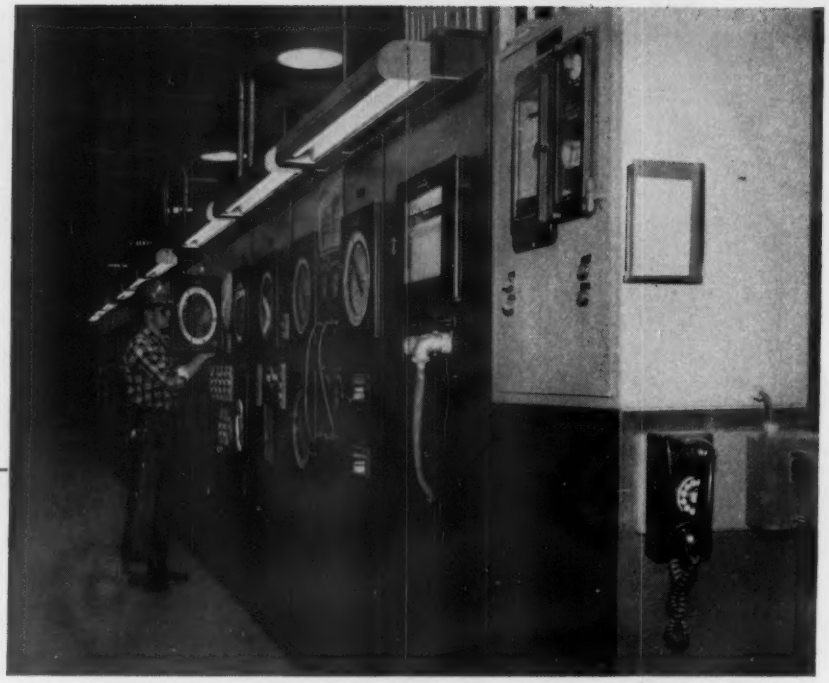
Miller Air Cylinders are available in 1½" through 20" bores for 250 psi operation. Select from 19 standard mountings, strokes up to 22 feet, single and double rod end, cushioned and non-cushioned, and over-size rod cylinders. Large selection for immediate delivery.

Circle 618 on Page 51

FLUID POWER DIVISION

2034 N. Hawthorne Ave., Melrose Park, Ill.

AIR & HYDRAULIC CYLINDERS · BOOSTERS · ACCUMULATORS
COUNTERBALANCE CYLINDERS



One of three cupola control panels contains ***ElectroniK*** controllers for two cupolas and a heat exchanger.

Honeywell controls aid in production of 3500 engine castings a day at new engine foundry

The new foundry of one of America's leading auto manufacturers has set a fast pace in the production of 6 and 8-cylinder engine castings.

In three phases of foundry operation—sand drying, core drying and cupola operation—Honeywell recording and controlling instruments help keep production humming.

This modern instrumentation complements the most up-to-date equipment for fast handling of materials. Overhead and floor conveyors speed movement of cores, molds and castings. Molten iron from cupolas is transferred in ladles carried in electrically-driven, cab-type cranes suspended from overhead monorails.

Here, as in many other types of foundry operation, Honeywell instrumentation pays for itself in terms of production, efficiency and quality. Your nearby Honeywell field engineer can help you gain these benefits in your own plant. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Honeywell

H HONEYWELL *First in Controls*

Circle 619 on Page 51

Circle 620 on Page 51→

THIS IS

NATIONAL

Engineering

1958

TRANSLATING YOUR NEED FOR PROFIT...INTO PROFIT

The Control of Sand Properties . . .

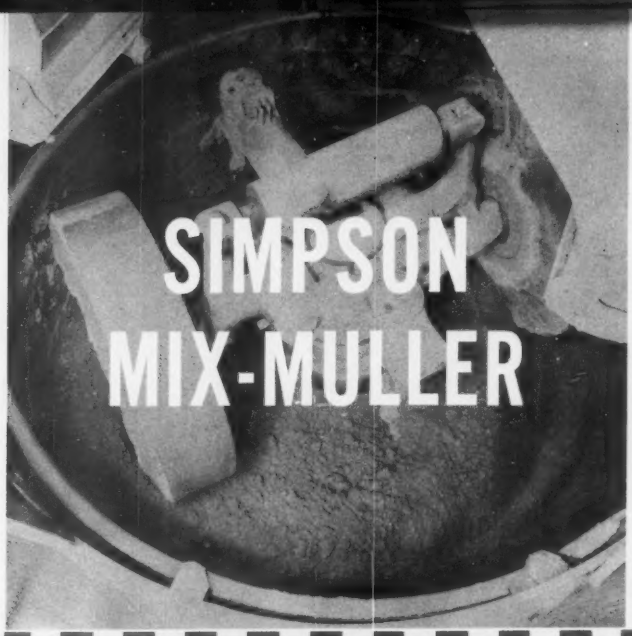
Your Greatest Source for Profit

The preparation and handling of sand and the control of sand properties can be a principle source of *profit* or a great contributor to the *loss* of profit for *any* foundry.

In today's tight and competitive market, many operators who have an acknowledged need for more carefully controlled sand practices may be *already paying* for the mechanized efficiency they hope to achieve or "afford" . . . at a later date.

This bulletin is designed to point out facts about National equipment and services which can make it easier and more economical for you to consider planned mechanization right *now*—than to "wait for '59" . . . and perhaps miss the *profit opportunities* that will go out of your shipping room door *every day* in 1958.

ANOTHER!
PROVEN PRODUCT OF THE PRACTICAL FOUNDRYMAN
BY NATIONAL



for Economy:

THE FOUNDRYMAN'S CHOICE—By 4 to 1

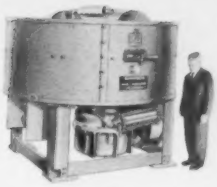
These advantages of the Simpson Mix-Muller have appealed to foundrymen since *Simpson mulling* replaced the shovel as a means for sand preparation.

SIMPLICITY of design provides low maintenance and long wear life. You use half the power and produce *none* of the heat generated by doing the same job on other equipment.

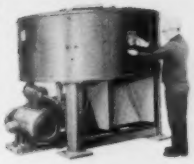
LARGE CAPACITY. You'll get *more* mulling per batch, per hour, per ton of sand and *per dollar invested* in sand conditioning equipment.

These primary advantages add up to dollar savings in scrap, cleaning costs, time, labor and maintenance. They are the reasons why, for almost 50 years, Simpson Mix-Muller has been the choice of practical foundrymen by *four to one.*

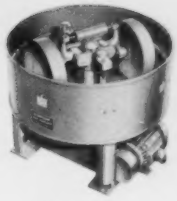
The modern, versatile F-Series Mix-Muller is now available in a size and capacity to meet *any* foundry requirement and for sand of *any* composition or formula.



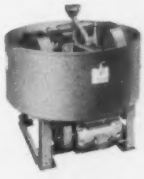
Model 3F
4000 lb. batch (min.)



Model 2½F
3000 lb. batch (min.)

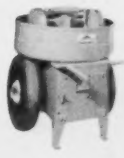


Model 2F
2000 lb. batch (min.)



Model 1½F
1000 lb. batch (min.)

Model 1F
500 lb. batch (min.)



Porto Muller
300 lb. batch (min.)

LF (Laboratory)
25 lb. batch (min.)

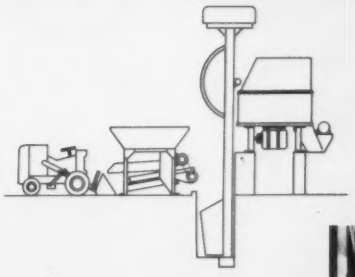
PRACTICAL FOUNDRYMEN HAVE SELEC

NATIONAL BUDGET UNITS

GROW WITH YOU—and your profits

National planned-progressive units are designed to help small and medium size foundries realize maximum production at welcome savings in time and labor —*without* the expenditure necessary for major plant change and full mechanization.

These are flexible, unitized items of equipment designed to get sand *overhead*—to leave the molder free *to mold* and free your floor for fast, clean and efficient foundry operations. A glance at the equipment will show you why no foundry is too small to take advantage of the growth opportunity offered by National progressive units. Remember too, your National Representative can show you the best and fastest way to use these units so that they will *pay their own way* . . . in increased profits.

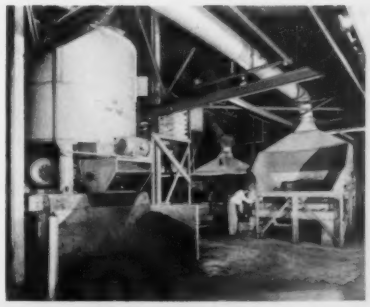


NATIONAL UTILITY UNITS

An expandable sand preparing plant consisting of a screening device with magnetic separator, elevating equipment and Mix-Muller of any size. Can be extended or altered, by units, to fit into the plans of any foundry. Is particularly well suited for the jobbing foundry. 12 months amortization is typical. Five figure savings yearly in manpower alone are reported and documented.

At Keene Foundry,
Griffin, Indiana . . .

Utility Unit saved over $25,000 in a year...working conditions improved 100% . . . now clean a 500-ft. long floor in 3 hours—formerly took entire 8 hour shift . . . save $5.40 per ton of casting . . . unit amortized in 3 years of operation.

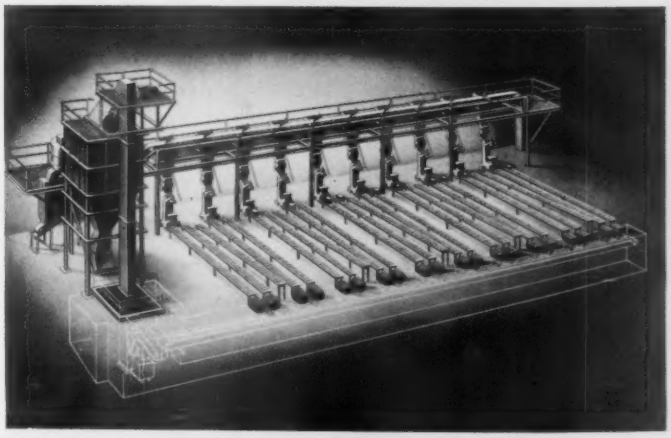


NATIONAL PLANNED-PROGRESSIVE UN

A MACHINE TO PRODUCE CASTINGS

National Engineering Company's most valuable asset is a background of experience which permits competent appraisal of your problem.

We regard a molding system as *machine* of varied and intricate parts, some human and some mechanical, which are coordinated to produce one end result—*better castings.* At what cost are these castings produced? At what savings in man hours? These factors must be weighed against the cost of mechanization with careful consideration given to the particular needs of *your* foundry. No two needs are alike. No two systems are alike. It is in the competent appraisal of these factors that your National Representative can *show you* how National systems pay off fast—*in profits.*



Here *standard* National units are engineered to form a complete progressive sand preparing plant using *roller conveyors* for mold storage, through pouring—to shakeout.

'S CHOICE—By 4 to 1

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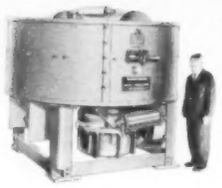
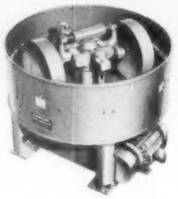


Model 3F
4000 lb. batch (min.)

Model 2½F
3000 lb. batch (min.)



Model 2F
2000 lb. batch (min.)

Model 1½F
1000 lb. batch (min.)

Model 1F
500 lb. batch (min.)

Porto Muller
300 lb. batch (min.)

LF (Laboratory)
25 lb. batch (min.)

for sand quality:

INTENSIVE *CONTROLLED* MIXING

True mulling is the mechanical application of working pressure. It can be likened to the intensive blending achieved in a mortar and pestle. The kneading, smearing, spatulate action effected in the Mix-Muller is unique in its ability to (1) wrap each grain evenly with plasticized bond or resin; (2) effect no reduction in grain size; (3) produce no frictional heat and; (4) produce a uniform blend of *any* materials needed for molding.

This is how it works.

1 . . . the plows *fold* the sand to stir and repile it into the Muller path, thus insuring *thorough* mixing and mulling.

2 The Mullers radius to ac *spatulate* ac forward the ways to p *shearing* ac

4 A unique fea Series Mix-M *loaded* mulle adjusted to amount of for the sand As sand str during the pressure exer increases to erties and st

PRACTICAL FOUNDRYMEN HAVE SELECTED SIMPSON MIX-MULLER BY F

UNITS

and your profits

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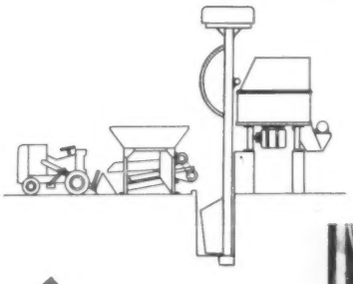

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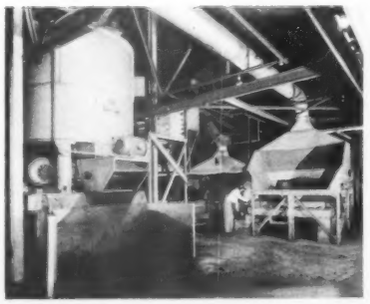

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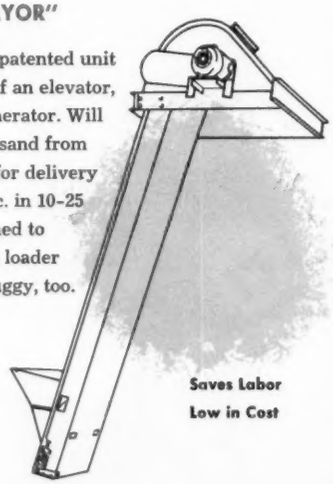
NATIONAL "ELEVAYOR"

This unique National-patented unit has the best features of an elevator, belt conveyor and an aerator. Will elevate a full batch of sand from mixer discharge door for delivery to belt, hopper, bin, etc. in 10-25 seconds. Can be designed to receive from front end loader weigh larry or sand buggy, too.



High in Efficiency
Has 1000 and 1 Uses
Saves Labor
Low in Cost

NATIONA

Any found the costly mixer to unit. It ca duction 50 ing and molding a more space cupies. It's ard arran available. inexpensiv

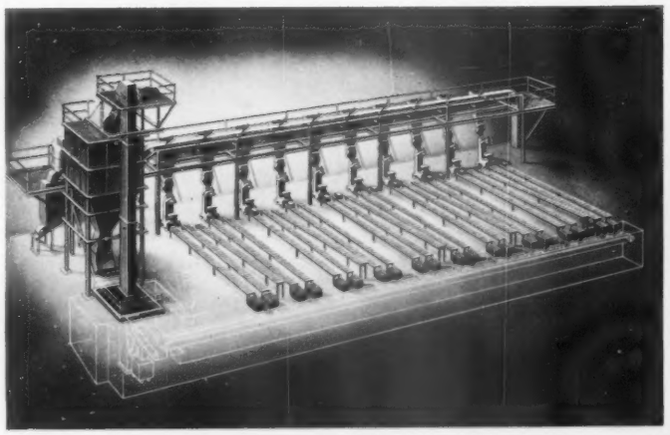
Single Molde

NATIONAL PLANNED-PROGRESSIVE UNITS ARE GEARED TO GROW WITH

TO PRODUCE CASTINGS

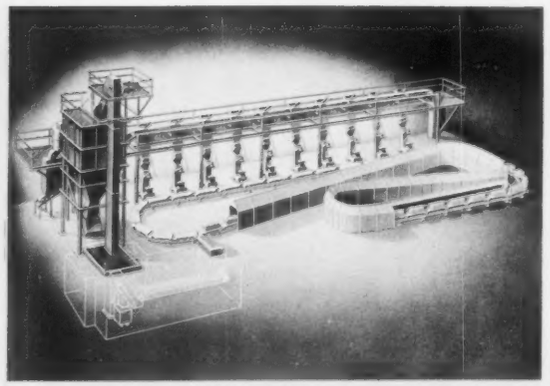
Company's most valuable asset is rience which permits competent lem.

ng system as *machine* of varied ne human and some mechanical, to produce one end result—*better* are these castings produced? At hours? These factors must be st of mechanization with careful o the particular needs of *your* s are alike. No two systems are petent appraisal of these factors epresentative can *show you* how off fast—*in profits.*



Here *standard* National units are engineered to form a complete progressive sand preparing plant using *roller conveyors* for mold storage, through pouring—to shakeout.

Here is the same layout using the National Mold Conveyor to provide efficient, continuous pouring and shakeout operations. Note simple, sturdy construction of cooling zone enclosure.



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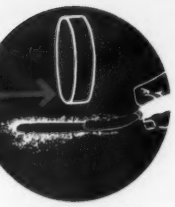
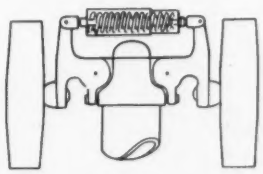


ullers are set off the true
to achieve an intensive
ate action. As they roll
rd they also skid side-
to produce a *sliding*
ng action.

3 . . . the inside edges have a shorter distance to travel than the outside edges—to create a rotary *smearing* action across the wide face of the Muller.

ue feature of the new F
Mix-Muller is the *spring-*
mullers which may be
ed to exert the exact
t of pressure required
sand being processed.
nd strength increases
the mulling cycle, the
re exerted by the mullers
es to develop full prop-
and strength.



MAKE THE MOST OF YOUR MIX-MULLER

with these *foundry proven* auxiliaries

National produces a full line of sand preparing auxiliary items that are designed to (1) save you time or, (2) take the guesswork or elements of human error out of your sand control operations. All of these items are designed and built specifically *for foundry use*, by National, for use with the Simpson Mix-Muller.

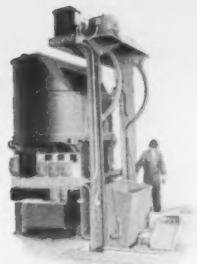
WRITE FOR SPECIFICATIONS

AERATORS

Eliminate riddling, **get free-flowing, lump-free sand at the molder's station with a National Aerator. This is a machine specifically designed for aeration. Available for mixer discharge attachment or location anywhere in the system.**

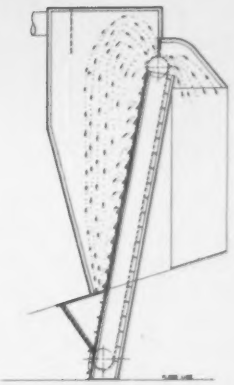
TIMEMASTER

Eliminate batch composition guesswork. **Get full automatic control over batch makeup and mulling cycle with the National Time Master.**



BUCKET LOADERS

Cut operator time in half **with a National Bucket Loader. Eliminate over and under-charge and laborious manual charging of mixer. Save up to 50% in sand preparing time.**



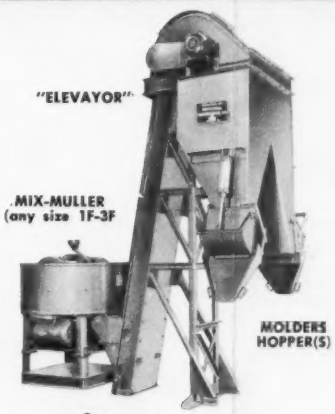
COOLEVAYOR

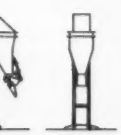
Cool sand before storage **with the unique new "Coolevayer". Not a mixer attachment or "also-cools-sand" device . . . Coolevayor is specifically designed to provide an economical means to cool sand to room temperature between shakeout and mixer.**

FOUR TO ONE FOR ALMOST FIFTY YEARS — PULL OUT

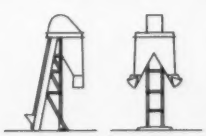
IONAL MOLDER'S HELPER

foundry can afford to eliminate
ostly job of handling sand from
to molder with this compact
It can increase molder's pro-
n 50%, eliminate floor shovel-
nd concentrate your entire
ng and *mixing* operation into
space than one molder now oc-
s. It's flexible, too—many stand-
rrangements, as shown, are
ble. Write for details on this
ensive sand handling "system."

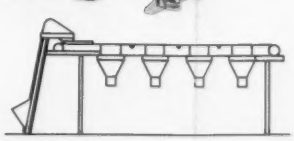




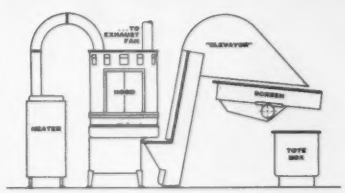
Molder's Hopper



Double Molder's Hoppers
(side or front discharge)

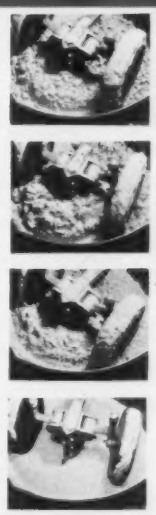


Four to six stations (belt delivery)



NATIONAL SHELL-MULL

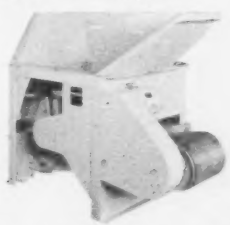
This fully integrated shell sand preparing plant is designed to incorporate any size Mix-Muller. It will provide as little as 600, or as much as 20,000 lbs. of uniformly coated, resin sand per hour. It is now used as standard shell mold equipment in over 40 foundries, including *every* principal auto manufacturer in the U.S.



Photos show how *true* mulling action blends shell mold components into a uniformly bonded, homogeneous preparation . . . quickly and expertly.

NATIONAL SCREENMASTER

This compact, easy-to-use screening unit requires no pits or foundations. Is easily incorporated into any existing installation. Is equipped with powerful ALNICO magnetic pulley, lump-breaker, vibrating screen and full thirty cu. ft. hopper.



Adjustable Lump Breaker • 30"x 60" Heavy Duty Screen

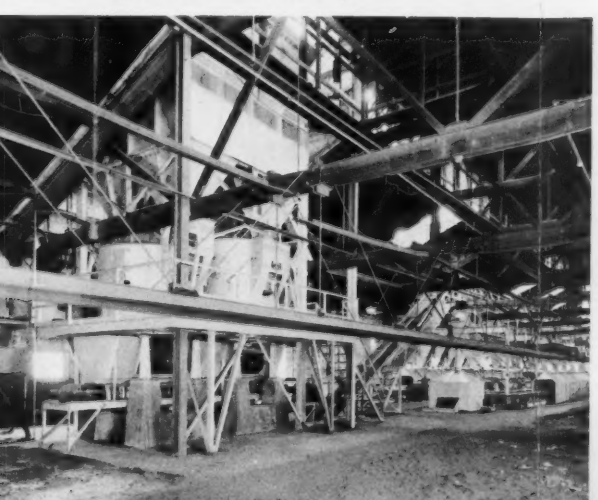
Easy Cleanup • 30 cu. ft. Hopper

Controllable vibration • no pits required

Radial Design Magnetic Pulley

TH YOU...AND YOUR PROFITS — PULL OUT

ere, though on a much larger scale, is an extension of the basic ational units incorporated into an entire sand preparing, handling; utomatic molding and automatic shakeout system.



NATIONAL HYDRO-FILTER

Here's a Dust Collector that cleans itself!

The National Hydro-Filter is an air "scrubber". Dust laden air is brought into contact with water under conditions which cause the dust to transfer to the liquid stream. It differs from conventional wet type dust collecting equipment in several ways—all of which represents radical improvement and assurance of maximum efficiency and low maintenance, over a wide range of operating conditions.

NO BAFFLES . . . to wear, corrode, or "load up" within collection area.

NO INTRICATE PARTS . . . to clean. Water action and glass spheres do the work with Hydro-Filter.

NO DEAD AREAS . . . Entire interior is constantly flushed. Every inch is used to collect dust particles.

STOPS DUST 4 WAYS

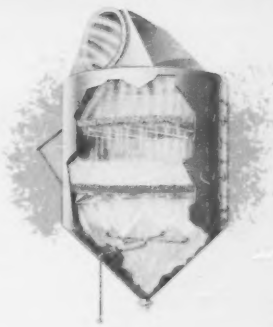
Four-way particle separation is effected as shown in the diagram at right, below.

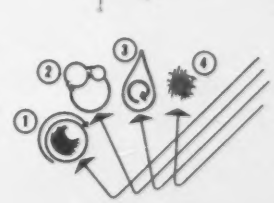
1. Impingement on wetted surface of glass spheres.

2. Impingement on bubble surfaces.

3. Entrapment within falling water droplets.

4. Impingement on wetted interior surfaces of the collector.





THE ADVANTAGES OF PNEUMATIC TRANSPORT

Pneumatic transport of bonded materials in the foundry offers certain advantages not found in any other conveying method. This is especially true where:

Expansion of existing molding requirements must be made within limited spaces.

Where the extension of mechanical handling facilities to remote areas becomes impractical.

Where centralized preparing plants are desirable.

Here are a few of the basic advantages you get with pipe line routing.

System operates in a confined, overhead area—little floor space is required.

It's completely flexible — can be designed to operate in virtually unrestricted path.

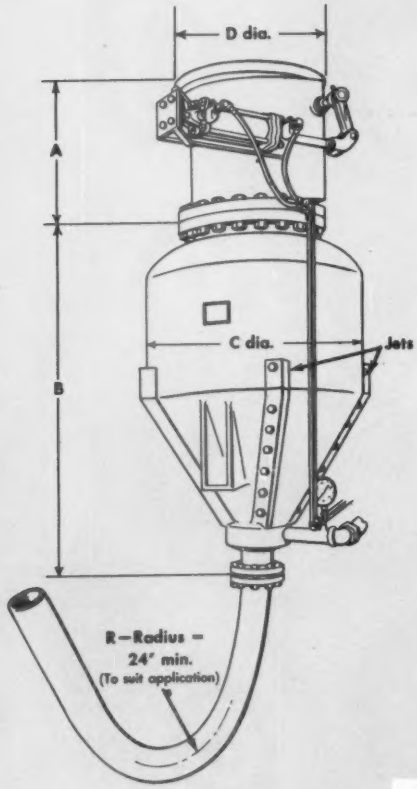
Anyone can operate a pneumatic system. No specialized operator skills are needed. System can be made fully automatic.

Maintenance is *not* absent; but nature of maintenance requires less time, is less specialized and is usually more economical than with mechanical system.

Materials are transported *within seconds* to their destination.

Materials are entirely confined to insure less housekeeping, cleaner operation.

THIS NATIONAL IMPROVED EQUIPMENT OFFERS MA



NATIONAL TRANSPORTER

THE TRANSPORTER

The transporter is the heart of the system. National Transporters are available in capacities of 7½, 15, 30, and 40 cubic feet. Clearance dimensions and rated capacities of various sizes of transporters are shown in the chart below. Here's what you get with this improved National Transporter:

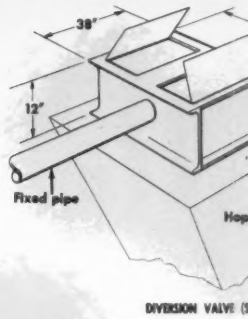
EASY ACCESS The National Transporter sealing gate is located in a *removable section* at the top of the Transporter (A) which is easily accessable for maintenance and may be replaced without completely dismantling the transporter and removing it from the system.

JETS ARE ADJUSTABLE Both the size of the air jets and the jet pattern can be varied to suit requirements of the materials to be conveyed. This feature makes it possible to blow at lower air pressures and to obtain the maximum aerating efficiency. Once the jets have been set for your material, they may be locked into position. All jet adjustments can be made from the *outside*.

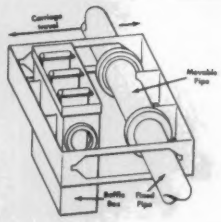
TRANSFORMER CAPACITY and DIMENSION DATA

Dimen.	7½	15	30	40
A	2'-0"	2'-0"	2'-0"	2'-0"
B	4'-3"	5'-7"	7'-0"	8'-4"
C	1'-10"	3'-0"	3'-6"	3'-8"
D	2'-3½"	2'-3½"	2'-3½"	2'-3½"

ANOTHER! PROVEN PRODUCT OF THE PRACTICAL FOUNDRYMAN BY NATIONAL



DIVERSION VALVE



POSITIVE ALIGNMENT FEATURE

POSITIVE SAFETY-LOCK SEAL

BOOSTER FITTING

Equipped with easy-open couplings

THE

Pipelines are m
4 or 5 inch extr
All bends are
cated bends. Sy
by competent,
who seek to
nance and kee
air consumptio
a minimum. B
designed to m
pipelines where
can be easily m
tions, when ne

C TRANSPORT FOR

PRACTICAL FOUNDRYMAN

CONVEYOR

METHODS · IMPROVEMENTS

IT TO ADVANTAGE AND PROFIT

THE IMPROVEMENTS MADE BY NATIONAL

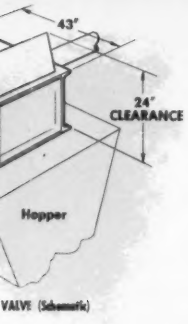
In offering a *coordinated* pneumatic transport service which includes design, layout, fabrication, engineering and erection; National has been able to overcome many of the shortcomings of earlier systems. Particular emphasis has been given to:

MAINTENANCE: National systems include only the latest *foundry proven*, patented components. Where improvements in operating and maintenance characteristics were needed—National engineers have incorporated them. Many of these improvements are shown here.

ENGINEERING and LAYOUT: Each National system is backed by the practical foundry engineering experience gained in our almost 50 years of service to the industry. Because National is experienced in *both* mechanical and pneumatic handling, prospective customers can be assured of unbiased, expert advice and, most important . . .

FOLLOW THROUGH: National Air Conveyor Corporation is staffed and equipped to provide competent *repair* and *parts* facilities; as well as *complete erection services.*

MAXIMUM PERFORMANCE AT MINIMUM MAINTENANCE



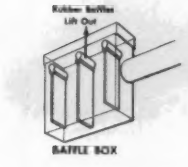
VALVE (Schematic)

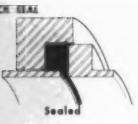
THE DIVERSION VALVE OR RECEIVER

TWO-WAY ACTION The National Diversion Valve is designed to receive sand from either direction in a pipeline. This permits a dual system in which two transporters can be used to deliver sand to more than one station at a time. The feature also minimizes complete shutdown, should trouble occur at one transporter or in one leg of the pipeline.

NO SWITCH AT STATION The new National Diversion Valve was developed to permit the receiving of sand at any point in a pipeline without the necessity of using a pipeline switch—normally a high maintenance item.

COMPACT The National Diversion Valve is Compactly designed to fit into close quarters and low headroom areas. It is totally enclosed to cut down housekeeping and to provide protection for the moving parts.





THE PIPING

are made up from either extra-heavy steel pipe. are large radius fabrils. Systems are laid out en[t], qualified engineers to minimize mainteto keep air presure and nption requirements to n. *Booster fittings* are to merely clamp into vherever needed. They ily moved to new locan necessary.

THE SWITCH

In the National system switches are kept to a minimum. None are needed at diversion points. The National line switch mechanism incorporates the same positive lock-in feature illustrated under *diversion valves.* They can be indexed to serve up to 14 different positions.

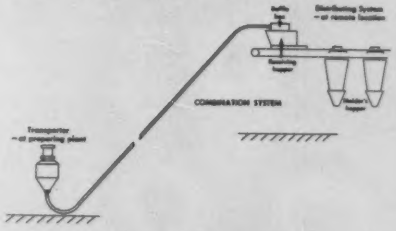
THE CONTROLS

A National Air Conveyor system is furnished with a complete set of manual controls including control valves, pressure regulator, shut off valves, and pressure gages. If desired, the entire system can be made semi-automatic so that a complete blowing cycle is started by merely pushing a button, or the system can be made to recycle automatically.

TYPICAL LAYOUTS

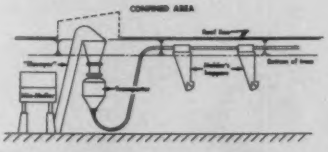
How National System can be used to profit and advantage.

Shown here are three schematic layouts which are typical of the type of installations where a properly engineered and executed pneumatic system can be used to reduce operating costs and increase production.



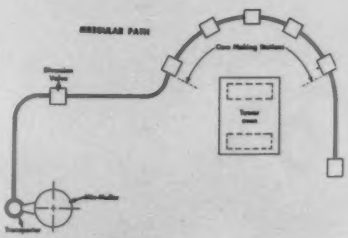
COMBINATION SYSTEM

Shows how a pneumatic system can be incorporated to provide practical extension of mechanical system to remote molding unit.



CONFINED AREA

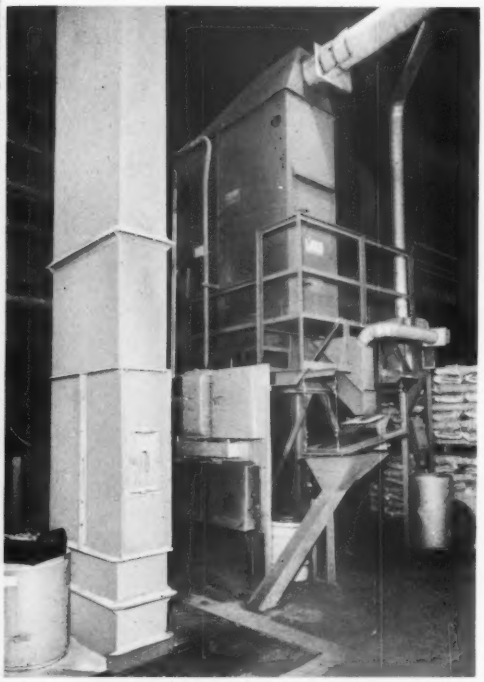
This arrangement illustrates how a pneumatic system can put relatively small and confined space to work as a molding area.



IRREGULAR PATH

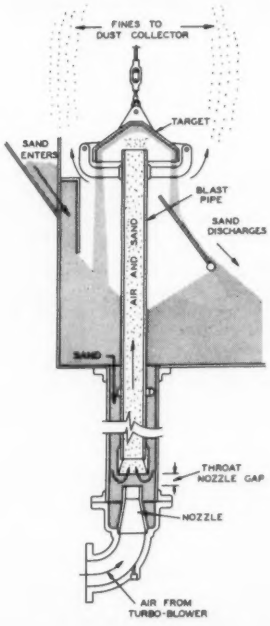
Here a pneumatic system makes it possible to locate core making or molders' stations along an irregular or circular path.

NEW SAND FOR OLD . . . NATIONAL SAND RECLAMATION SYSTEM



The National Sand Recovery System has been quickly accepted by foundry users all over the country as the *proven* means for the average foundry to reclaim sand at a profit. Users are reaping financial reward from reclaiming equipment that has paid for itself in as little as 12 months time. Many are compounding their savings by literally mining profits from *used sand.*

A recent study of savings among six average-volume users showed that National systems were turning in a savings of $5,000 each per month. Since 1952, leading U.S. foundries have *proven* the practicability of the National Scrubber in over *450,000* hours of in-plant operation.



THE FOUNDRY INDUSTRY IS OUR *BUSINESS*

For half a century National Engineering Company has devoted its activities to the planning, development and manufacture of foundry equipment designed to help you make better and more salable castings.

Modern day sand practices saw their beginning with the Simpson Mix-Muller. Synthetic sands and the extended usage of resin bonded, CO_2 and the many new sand formulations were largely made possible by the Simpson *intensive* mulling principle.

National Sand and Mold Handling Equipment has brought the low cost efficiency of unitized mechanization to many foundries who were doubtful of their ability to afford growth—yet certain of their *need* to grow.

WHY NOT LET NATIONAL HELP YOU TRANSLATE YOUR GROWTH NEEDS TO PROFIT OPPORTUNITIES IN 1958?

RETURN THE CARD FOR THESE NEW NATIONAL BULLETINS

National Engineering Co.
600 Machinery Hall Bldg.
Chicago 6, Illinois

- ☐ National Air Conveyor Corporation
- ☐ The Cooling of Foundry Sand by R. L. McIlvaine
- ☐ Simpson Mix-Mullers Series F
- ☐ National Sand Recovery System

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

Printed in U.S.A.

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NATIONAL ENGINEERING COMPANY
600 Machinery Hall Bldg.
Chicago 6, Illinois

A 3M Case History Report

GRINDING PRODUCTION INCREASED 50% WITH "WETORDRY" BELTS

MANUFACTURER: Dictaphone Corporation

ADDRESS: Bridgeport, Conn.

PRODUCTS MANUFACTURED: Dictating Equipment

3M ABRASIVE USED: "WETORDRY" Tri-M-ite Cloth Belts

HOW 3M ABRASIVES ARE USED: Sizing bottom side of cast magnesium main frame of Dictaphone dictating machine, to remove burrs and casting imperfections for true flatness.

OPERATIONAL DATA ON 3M METHOD: Grit 60 "Wetordry Tri-M-ite" Cloth Belt is used on an Engleberg Huller BG8 Grinder. Constant flow of water is maintained over grind surface of the magnesium.

OPERATIONAL DATA ON PREVIOUS METHOD: A competitive brand of abrasive belt was used for the same operation.

PROVEN ADVANTAGES OF 3M METHOD: Production increased 50% per belt—from 900 pieces with the former belt to 1,350 pieces per 3M Belt with no loss in time or decrease in quality.

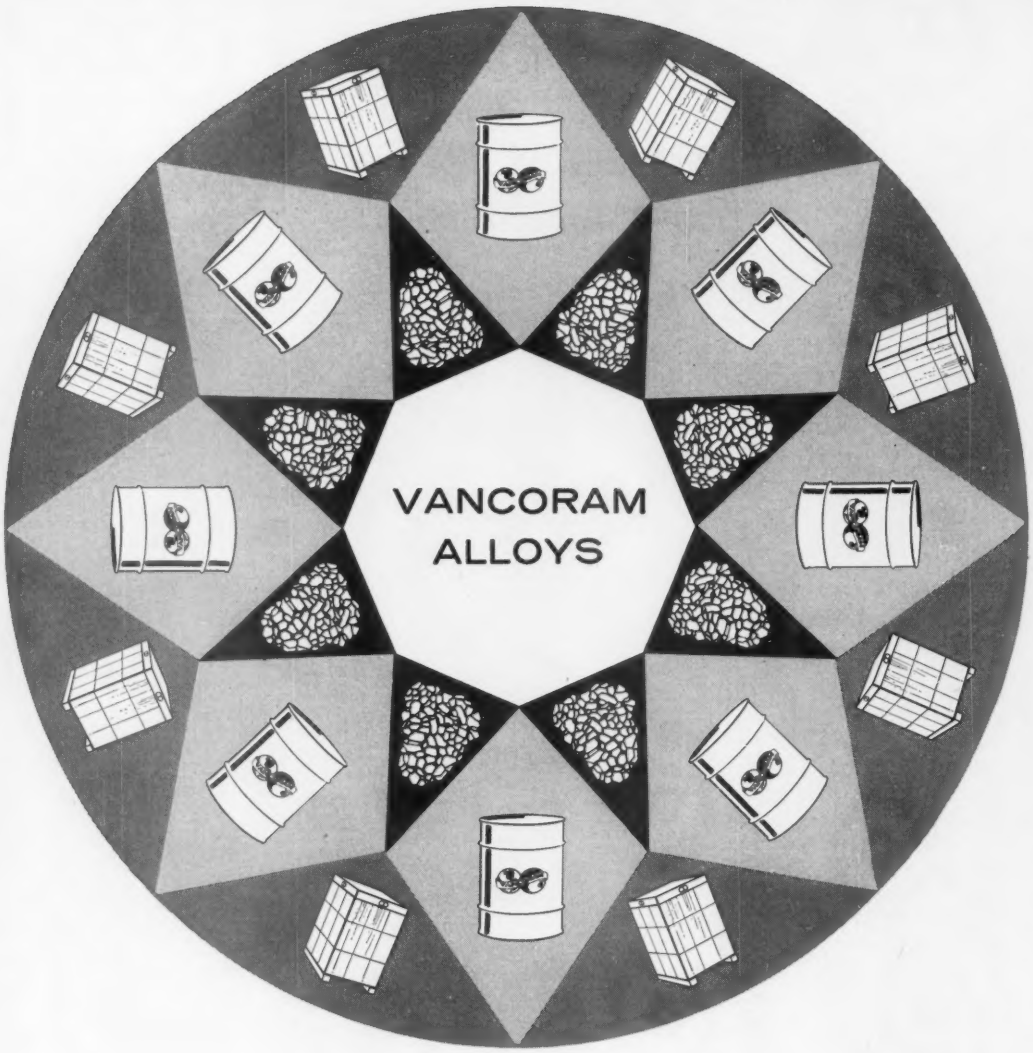
OTHER 3M ABRASIVE PRODUCTS NOW IN USE: "Three-M-ite Resinite" Cloth Belts are used to finish aluminum trim bands; "Tri-M-ite" Cloth "PG" Wheel used to pre-polish dictating belt mandrel ends.

WANT MORE INFORMATION? Send for free manual, "3M Method of Belt Grinding and Finishing." Just write on your letterhead to 3M Co., St. Paul 6, Minn., Dept. CN-58.

"Wetordry", "Tri-M-ite", "Resinite", and "Three-M-ite" are registered trademarks of 3M Co., St. Paul 6, Minn.
Export: 99 Park Ave., New York. Canada: London, Ontario

3M Coated Abrasives
"WETORDRY" CLOTH BELTS

MINNESOTA MINING AND MANUFACTURING COMPANY
...WHERE RESEARCH IS THE KEY TO TOMORROW
3M COMPANY



THERE ARE SCORES OF VANCORAM ALLOYS. They come in drums, pallet boxes, container cars, and in bulk. When quantity justifies, most VCA products are available in barge shipments. But no matter which ones you use . . . or the form in which you use them . . . they always contain two basic and unvarying ingredients:

Uniformity, and a high level of *quality* you can count on. *We know this because* we control the quality from mine to finished product. We apply over fifty years of alloy-making experience to the task of delivering to you the products that will do your job best, at lowest cost. Furthermore, we back every Vancoram product with a brand of *service* that matches the high quality of that product.

Vancoram — the first name in alloys, the last word in quality! Next time you need alloys, or help in solving ferro alloy problems, be sure to call your nearest VCA Office or distributor. Remember: they are there to serve you! Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y.

Come see our special packaging display at the AFS Castings Congress and Show, Booth Nos. 422-424, May 19-23, Cleveland, Ohio

Vancoram Products for the Iron Foundry are also distributed by:
PACIFIC METALS CO., LTD. • STEEL SALES CORPORATION
J. M. TULL METAL & SUPPLY CO., INC.
WHITEHEAD METAL PRODUCTS COMPANY, INC.
WILLIAMS & COMPANY, INC.

VANCORAM

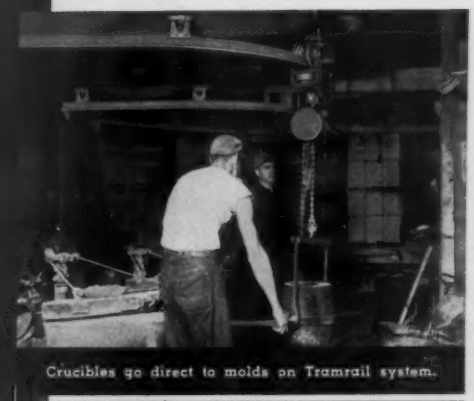
VANADIUM CORPORATION OF AMERICA

Circle 622 on Page 51

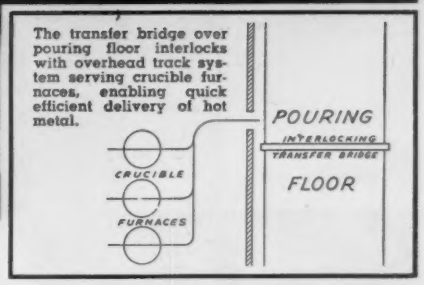
JUMPS FROM 3 HEATS TO 8 DAILY . . .

Tramrail System works wonders in 10-man foundry

Crucibles reach the molds quickly and the work is made easy and fast.



Crucibles go direct to molds on Tramrail system.


The transfer bridge over pouring floor interlocks with overhead track system serving crucible furnaces, enabling quick efficient delivery of hot metal.
POURING
INTERLOCKING
TRANSFER BRIDGE
FLOOR
CRUCIBLE
FURNACES

THE installation of a small inexpensive Cleveland Tramrail hand-propelled system at the Modern Brass Foundry, Columbus, Ohio, made a terrific difference in their operations. With no increase in man power, it made possible eight heats in a day instead of three, formerly usual. Despite more than double output, the men are now less fatigued at the end of a day.

No. 70 crucibles (240 lbs. capacity) are now used instead of No. 60 (200 lbs. capacity). It has been found that very little more heat is required to prepare 240 lbs. of metal than needed for 200 lbs. This provides a big saving in heat, which in itself goes a long way toward paying for the Tramrail equipment.

When they were considering installation of the overhead equipment, Modern Brass was quite concerned over a fear that it would not be fast enough and that they would be confronted with a large heat loss that would be troublesome. This fear has proven wholly unfounded. They have learned that working with Tramrail equipment is much faster than when pouring by hand.

Mr. R. E. Gleich, president, said as far as he was concerned the Cleveland Tramrail system paid for itself the first day in operation, because it so eased their work. After the first day he knew they could never afford to be without it. As a matter of fact, the equipment actually did pay for itself within a few weeks out of savings it brought about.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3829 East 286th Street, Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Circle 623 on Page 51

ROSS Air Systems

Engineered Atmospheres for Better Processing

SOLVING PROBLEMS IN CORE OVEN DESIGN

Significant Specified Operational Data:

Rated Capacity
15,000 pounds of sand (core molds) per hour

Baking Temperature
450°F.

Baking Cycle
4 hours (4 passes)

Cooling Cycle
2 hours (2 passes) with products delivered at 110°F.

Two Composite Parallel Baking and Cooling Units
66′ wide x 10′ high x 110′ long

One would think that to design these units so as to create and hold these temperatures continuously within close tolerances hour after hour presented problems enough. But there were others that called for all the experience and ingenuity Ross Engineers could bring to bear, problems such as gas leakage into the working areas had to be avoided . . . an air seal vestibule did this. Or sealing off the cooling areas from the baking areas yet provide continuous travel . . . utilizing a natural heat seal took care of this problem. Or thorough and uniform distribution of both the processing hot air and the cooling outdoor air . . . overhead ducts and the Ross Special Nozzle System solved this one.

This entire core curing system, installed in a large automobile parts foundry, was designed, constructed and equipped by Ross Engineers. It comes well within the scope of their broad specialized service on Engineered Atmospheres because the design, creation and maintenance of closely held baking and cooling atmospheres is the heart of the problem. Many other industries have similar problems. Ross Engineers are serving those industries, too.

Representatives:
W. Thomas Barr Associates,
P.O. Box 5832, Birmingham 9, Ala.

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J. O. Ross Engineering, New York
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Carrier-Ross Engineering Company, Ltd., England
John Waldron Corporation, New Brunswick, N. J.

J. O. ROSS ENGINEERING
Division of Midland-Ross Corporation

444 Madison Avenue, New York 22, N. Y.
ATLANTA • BOSTON • CHICAGO
DETROIT • LOS ANGELES • SEATTLE

Circle 624 on Page 51

OREFRACTION®

Trade Mark Registered U.S. Pat. Office

ZIRCON

FLOUR

- ZIRCON FOUNDRY FLOUR
  140, 200, 400 Mesh Sizes

SAND

- DOMESTIC & AUSTRALIAN ZIRCON FOUNDRY SANDS

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ANDREWS, SOUTH CAROLINA

"UNIPAK-COATER"

NOW—COATED SAND TO YOUR SPECIFICATIONS FROM THIS LOW COST, COMPACT "PACKAGE UNIT!"

Here's your answer if you now make shell molds or cores, or contemplate using coated sands. The "Unipak-Coater" by Sutter assures definite quality superiority along with maximum economy in the production of any shell core or mold. It uses all types of sands and resins, coats by either hot or cold process, thoroughly aerates the coated sand, has a top capacity of 6,000 pounds per hour, requires minimum maintenance. Other outstanding features:

- *The benefits of pre-coated sand over mechanically mixed sand and resin.*
- *The economy of using your own pre-coated sand.*
- *Positive sand-coating quality control to your own specifications.*
- *Elimination of dust problems versus dry mixing.*
- *Compact, space-saving, self-contained design.*
- *Low labor cost . . . one operator continuous system.*
- *Fully-interlocked cycle with maximum flexibility.*
- *Electrical, gas and pneumatic equipment to J.I.C. standards.*

The "Unipak-Coater" is engineered and built by specialists who know the requirements of all phases of shell mold and core making. Let us show you how this machine will positively solve your sand coating problem. Complete engineering, laboratory and plant facilities at your disposal for testing. Write for data file describing all Sutter foundry equipment.

SUTTER PRODUCTS CO.

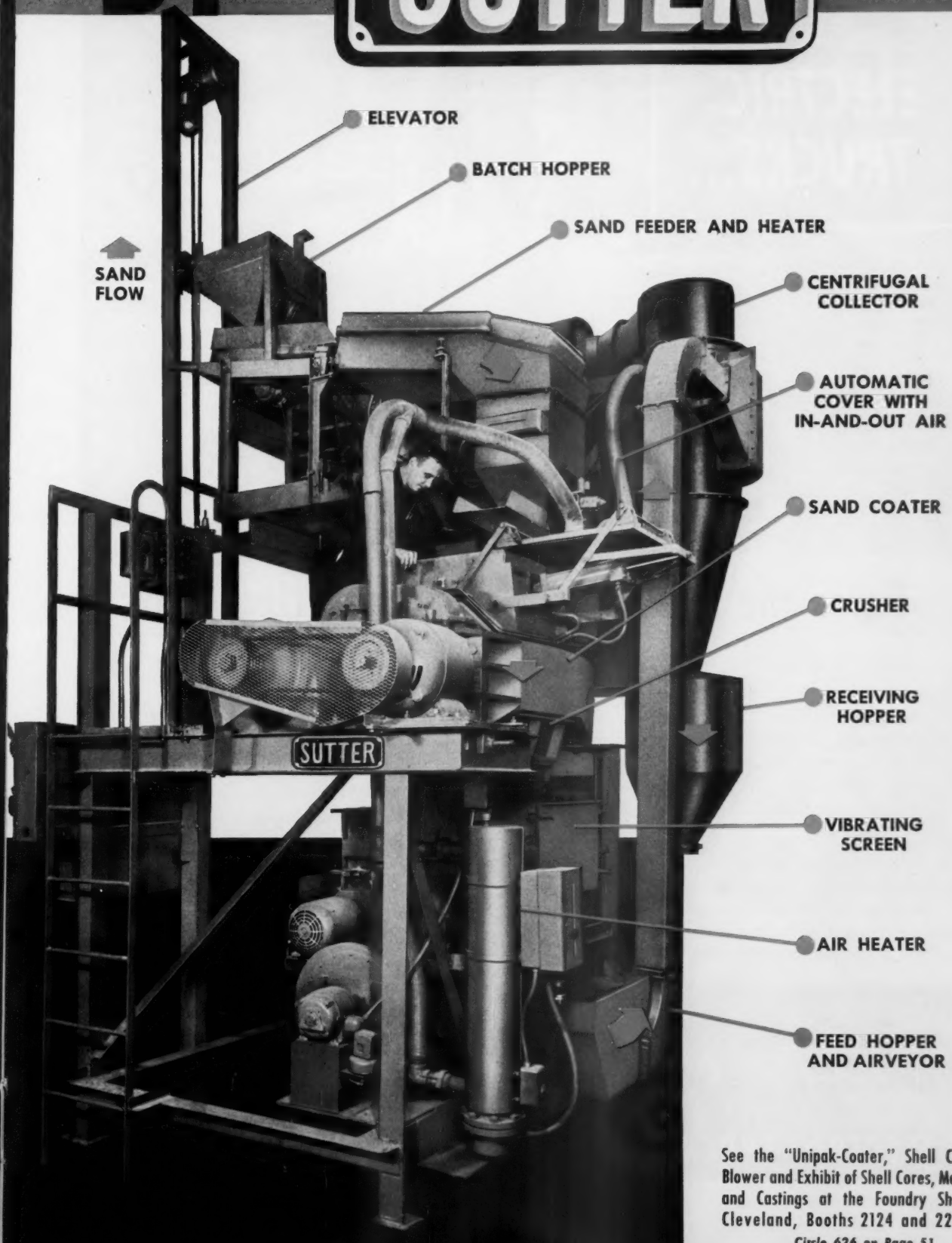
407 HADLEY STREET • HOLLY, MICHIGAN

World's largest manufacturer of shell mold and core making equipment—Designers and manufacturers of many types of foundry machinery and equipment.

VERSATILITY! Typical shell molds and shell cores, along with castings produced from them. Every mold and core utilizing various combinations of sand and resin . . . illustrating the versatility possible with the **"UNIPAK-COATER."**

SUTTER

BY SUTTER



See the "Unipak-Coater," Shell Core Blower and Exhibit of Shell Cores, Molds and Castings at the Foundry Show, Cleveland, Booths 2124 and 2223.

Circle 626 on Page 51

ELPAR®

ELECTRIC TRUCKS...

New ELPAR R-10 series fork truck.

Twice the Life... ⅓rd the Operating Costs

In buying power industrial trucks, look beyond initial costs—and you'll discover these overwhelming advantages of ELPAR electric trucks:

- ELPAR electric trucks last at least twice as long as gas trucks operating under comparable conditions. Thus, when *all* initial and replacement costs are added up, ELPAR trucks actually *cost less to buy.*
- ELPAR truck operating and maintenance costs are only one-third those of comparable gas models. Based on 2,000 hours of operation, this means an average saving in direct operating costs of over *$1,200 per truck per year.*

These facts are based upon actual case studies from a number of plants. They explain why 75 of the 100 largest U. S. corporations now are using ELPAR trucks . . . and why more and more companies are converting their fleets to ELPAR electrics.

Learn how ELPAR trucks can make short work of your toughest materials handling problems —with an almost unbelievably high bonus of savings . . .

SEND FOR YOUR COPY

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ELPAR®

ELECTRIC TRUCKS

THE ELWELL-PARKER ELECTRIC COMPANY

4314 St. Clair Avenue • Cleveland 3, Ohio

Twice the Life . . . ⅓rd the Operating Costs

Taylor & Company specializes in versatility with HANNA PIG IRON

Taylor & Company, Inc., Brooklyn, New York, casts them little and big with equal ease—from dry-sand castings that weigh tons, to light close-tolerance parts cast by the shell-molding process. As many as 6,000 different patterns are used by Taylor in an average month.

For seventy-five years, this merchant foundry has turned out a variety of sizes and shapes with the aid of high-quality Hanna pig iron, especially Hanna Malleable and Hanna Silvery grades. President William Z. Taylor has never failed to find Hanna a dependable source of supply for any analysis he needs to meet his customers' requirements.

Whatever you cast, there's a Hanna iron to do it best. All regular grades of pig iron, plus HannaTite and Hanna Silvery, are available in 38-pound pigs and the smaller HannaTen ingots. For prompt service, call on one of Hanna's trained representatives.

△ *This 6-ton dry-sand casting will be a machine tool base that stands up to vibration and shock, provides a rock-steady foundation for accurate work.*

◁ *These small parts were cast to close tolerances by the shell-molding process, and need little or no machining.*

THE HANNA FURNACE CORPORATION
Buffalo • Detroit • New York • Philadelphia
Merchant Pig Iron Division of
NATIONAL STEEL CORPORATION

Circle 628 on Page 51

. . . . . with

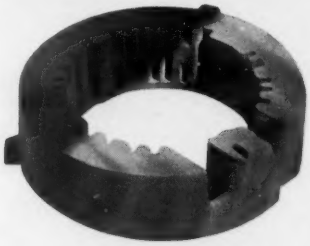
DELTA

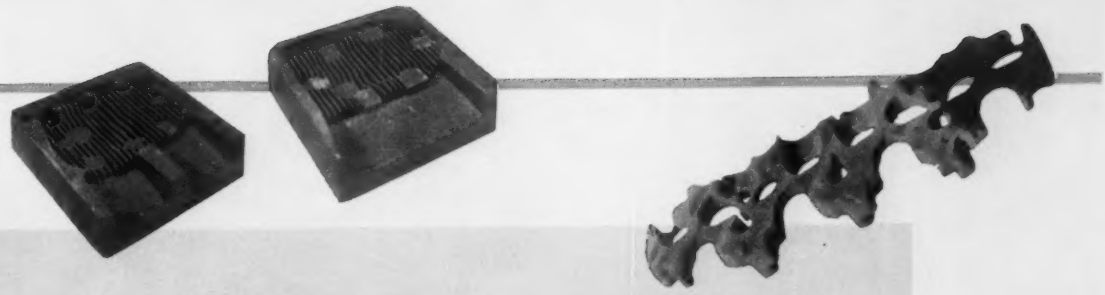
foundry products

Every DELTA Foundry Product is backed by continuing and exhaustive laboratory research to safeguard quality and maintain absolute uniformity of the finished product. Every step in the manufacturing processes is under strict laboratory control and all raw materials must conform to rigid quality specifications.

Delta Oil Products Corp. not only pioneered the development of plastic-type core and mold washes but has continued to lead in the development of new and improved products for the production of better castings — faster and more economically.

Delta sales technicians are ready, at all times, to assist in the more effective and more economical use of core oils, core and mold washes and sand additives for increased efficiency and lower production costs.





CORE AND MOLD WASHES:

FOR STEEL:
- *Special Core and Mold Wash Base
- *SteelKoat
- *PyroKoat-S
- *SuperKoat
- *ThermoKoat
- *Z-Koat
- *ZZ-Koat

FOR GRAY IRON AND MALLEABLE:
- *GraKoat
- *BlacKoat
- *SuperKoat
- *BlacKoat C-2
- *BlacKoat C-4
- *DriKoat B-3
- *DriKoat B-5
- *BlacKoat S-5
- *PyroKoat-S
- *PyroKoat-G

FOR ALL TYPES OF SAND CAST METALS:
- *ThermoKoat
- *Z-Koat
- *ZZ-Koat
- *SuperKoat

FOR NON-FERROUS METALS:
- *NonferrusKoat
- *SuperKoat
- *GraKoat
- *DriKoat F

PARTING COMPOUNDS:
- *Partex
- *Super Partex
- Liquid Parting
- Liquid Parting Concentrates

***PART-RITE LIQUID PARTING**

MUDDING & PATCHING COMPOUNDS:
- *Sliktite
- *Ebony

MOLD SEAL COMPOUNDS

***NO-VEIN COMPOUND**

MOLD SURFACE BINDERS — Liquid

***DRI-BOND**

***BONDITE**

INGOT MOLDKOAT
- 250XX Powder
- 277XX Liquid

SURFACE HARDENERS FOR CORES AND MOLDS
- 258XX Spray Binder Concentrate
- Spray Binders — Liquid

SILICATE BINDER
- 292XX Excellent Collapsibility
- 270XX Good Collapsibility
- 285XX Fair Collapsibility
- 299XX Poor Collapsibility

GRIPTITE CORE PASTE

CORE ROD DIP OIL

CORE OILS

CO_2 BINDERS

LIQUID RESIN BINDERS:
- 155-X Fast-Dri
- 168-X Fast-Dri
- 191-XX Fast-Dri

FOR SHELL MOLDS
- DELTA-Dietert Process Binder 103XX (For "D" process shell cores.)

FOR SAND:
- *Permi-Bond (sea coal replacement)
- *Sand Conditioning Oils
- *96-B Sand Release Agent

Visit us...

AT OUR BOOTH 605 during the 62nd Annual A.F.S. Convention and also at our suite in the Cleveland Hotel.

get the facts...

Working samples and complete literature on Delta Foundry Products will be sent to you on request for test purposes in your own foundry.

A Foundry First — by Delta.

DELTA

DELTA OIL PRODUCTS CORP.

MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

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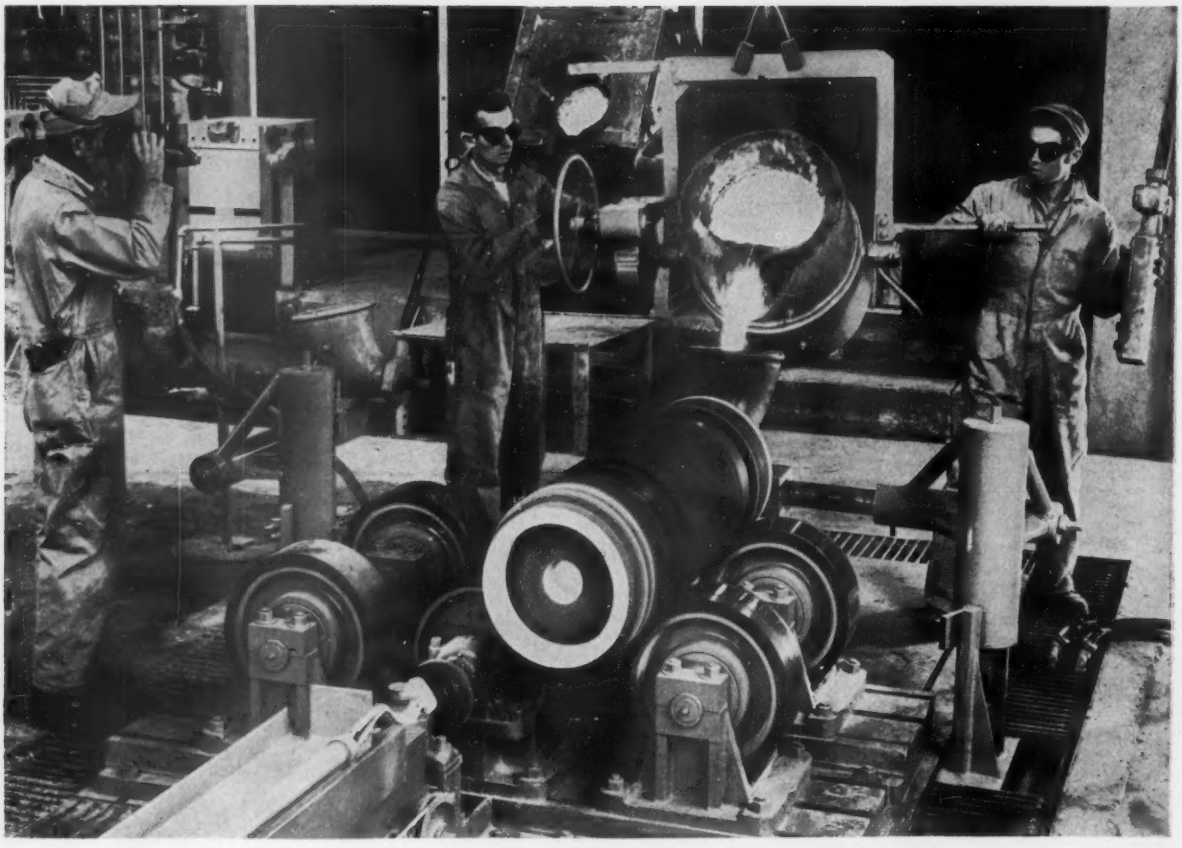
Circle 629 on Page 51



WHY GOOD CENTRIFUGAL CASTING DEMANDS INDUCTION MELTING

Though centrifugal casting has values apart from any melting furnace used, it achieves its ultimate performance only with induction melted metals. You may have wondered yourself why the vast majority of critical centrifugal castings are poured from Ajax-Northrup induction furnaces. The reasons are many—

Take purity for example. One major advantage of centrifugal casting is that the spinning concentrates impurities such as dirt, slag particles, even gas, at the internal skin, where they can be machined away easily. Obviously, the purer the melt, the thinner the skin to be machined. And Ajax-Northrup induction melting has proved itself many times over to be the purest melting method known!

Or take uniformity. The electromagnetic stirring action inherent in the Ajax-Northrup induction furnace assures absolute uniformity of chemical composition and temperature throughout the melt, resulting in consistently homogeneous castings, even with alloys containing metals of widely varying densities such as Al, Ni, and Mo. In fact, users have been able to eliminate uniformity tests on Ajax melted centrifugal castings entirely.

The precise metal temperature control available with Ajax-Northrup induction equipment is another important consideration in the production of consistently uniform castings. Hot and cold pours are eliminated. And this combination of ideal temperature control and perfect mixing adds up to good, reproducible results.

Ajax-Northrup induction melting equipment, with its unique control system offers you maximum melting efficiency with resulting lower melting costs. The new compact designs incorporate many features which minimize floor space requirements, drastically reduce installation costs, minimize maintenance, and provide simple, more efficient operation.

Induction heating & melting

AJAX

NORTHRUP

Whether you're centrifugal casting tiny investment castings, massive rolls, or critical jet engine tail sections, you're sure to find an Ajax furnace that satisfies your needs perfectly. We'll gladly send you further information, or, if you wish, arrange a meeting with qualified furnace engineers to discuss your special requirements. Ajax Electrothermic Corporation, Ajax Park, Trenton 5, New Jersey.

ASSOCIATED COMPANIES: AJAX ELECTRIC COMPANY-AJAX ENGINEERING CORPORATION

Rugged, versatile equipment manned by craftsmen of long experience maintains the Pyle reputation for flawless patterns delivered on schedule. This Carlton Radial Drill plays an important part in the flow of patterns for high production castings through the integrated Pyle operation.

. . . we suggest you look to Pyle! Our business has been built serving customers who accept nothing less than perfection.

Here every wooden model is prepared in flawless detail by men averaging 19 years of patternmaking experience. Our integrated foundry is designed, equipped and operated exclusively for pattern production. We have the lathes, radial drills, milling machines, planers and hydraulic or automatic duplicators to meet your every need. Meticulous hand finishing and uncompromising inspection guarantee your complete satisfaction.

For fifty years we've made patterns for America's most quality-conscious firms. May we have the pleasure of making them for you?

PYLE

PATTERN AND MANUFACTURING COMPANY

Muskegon Heights, Michigan

Circle 631 on Page 51

the RELIANCE FOUNDRY CO., Cincinnati, reports:

"Our savings in time and materials offset over 50% of the cost of KOPESEAL® cope and drag sealer."

"In the old days," says F. E. Hutchinson, vice president of The Reliance Foundry Co., Cincinnati, Ohio, "we sealed our copes and drags by rolling out mud balls to the desired diameters and lengths. This antiquated method is now taboo since we were introduced to KOPESEAL, which makes a very uniform seal of the molds.

"Our savings in time and materials offset better than 50% of the cost of KOPESEAL. In addition, it makes molder helpers available for other work. Also, we always know we have the correct diameters for various sizes of molds at hand when needed. Parting readily adheres to KOPESEAL, adding to the tightness of the sealing of molds.

"Since using KOPESEAL, we have practically eliminated 'runouts', which, of course, are both costly and hazardous."

Hundreds of other foundries have switched to KOPESEAL for more effective cope and drag sealing . . . in *less* time . . . at *less* cost!

PRESSTITE Sealing Compounds

PRESSTITE - KEYSTONE ENGINEERING PRODUCTS COMPANY

K A P

A DIVISION OF AMERICAN-MARIETTA COMPANY

3766 Chouteau Avenue St. Louis 10, Missouri

KOPESEAL® cope and drag sealer

precision sealing for precision casting, eliminates runouts, replaces mud or dough rolls!

- **Convenient, ready-to-use right from the carton!**
- **Uniform extruded diameters from 3/16" to 3/4", in 30" lengths!**
- **Excellent compressibility eliminates runouts!**
- **Positive seating permits accurate measurement of metal thickness!**
- **Self-dissipating. No residue to worry about... use it, seal it, forget it!**

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Frederic B. Stevens, Inc.....Detroit, Mich.
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Railway and Power Engineering Corp., Ltd.
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Also Stocked and Distributed Under Following Brand Names:

KOPETITE:
Toronto, Ont.—Canadian Hanson & Van Winkle Co., Ltd.

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Philadelphia, Pa.—George F. Pettinos, Inc. • Hamilton, Ont.—Geo. F. Pettinos (Canada) Ltd. • Montreal, Que.—Geo. F. Pettinos (Canada) Ltd.
Kansas City, Kans.—Canfield Foundry Supplies.

KOPEROPE:
Harrison, N. J.—Springfield Facing, Inc. • Milwaukee, Wisc.—Milwaukee Chaplet & Supply Corp.

FOR A CONVINCING SAMPLE Contact your distributor

1 Beads of KOPESEAL, easily peeled from special paper backing, are placed on the drag prior to checking for correct cope seating. No mess, no mixing or forming.

2 KOPESEAL forms a continuous, uniform gasket-like seal around inside perimeter of the drag, preventing runouts when metal is cast.

3 Parting compound is dusted over KOPESEAL and the drag is ready to receive the cope. Subsequent inspection of compressed KOPESEAL head will indicate whether cope is perfectly seated and permits accurate measurement of metal thickness.

PRESSTITE Sealing Compounds

PRESSTITE - KEYSTONE ENGINEERING PRODUCTS COMPANY

K A P

A DIVISION OF AMERICAN-MARIETTA COMPANY

3766 Chouteau Avenue St. Louis 10, Missouri

Shell molds produce 25% saving at Anstice Foundries.

Foundry TRIPLES productivity with shell molds

"We've more than tripled our production rate on these castings by switching from green sand to shell molds.

"Now, when a customer needs castings on short notice, we can really give him service!"

So declares Harry Hanna of Anstice Foundries, Rochester, N. Y., a firm whose experience with shell molding dates back just two years. Anstice, like many foundries, uses Durez foundry resins exclusively.

Costs curbed 25%

Higher productivity is reflected in lower costs at Anstice, since shell molds can be produced quickly without pulling highly skilled labor off other jobs.

Cost of producing castings with shell is about 25% less than with green sand. This economy has enabled Anstice to pass on substantial price reductions to customers.

"Besides cutting costs, shell molding gives us an intermediate range of accuracy we couldn't achieve before, except by going to die casting," says Mr. Hanna. On one shell-molded job, for example, Anstice holds a 1/16" finishing allowance specified by the customer.

Smoother bore, better fins

Two other castings in point are finned grey-iron cylinders for air-compressor engines, weighing 20 and 40 pounds. Anstice makes both molds and the core for the smaller casting on a 20 x 30" shell molding machine, using sand bonded with Durez 18123 resin.

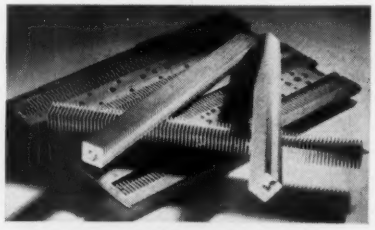
The shell core makes possible a smoother bore and eliminates much machining by the customer. Because of this advantage, serious consideration is being given to coring the larger casting in shell also.

Another example is a 36-inch-long finned aluminum heating casting for an electric baseboard heater. The heat source, a rod-type heating element, is embedded in the finned casting.

The combination of rod insert, deep draw, and thin fins presented some rocky problems in mold design, all of which have been worked out to the complete satisfaction of Anstice and the customer.

Send for new "Guide"

More foundries every month are reaping the benefits of shell molding with Durez resins. If *you're* interested in its high-productivity—low-cost aspects, send for a free copy of the *latest* 32-page "Durez Guide to Shell Molding." It's completely revised, fully illustrated —gives you up-to-the-minute information on patterns, materials, mixing, temperatures, lubricants, molds, cores. Write for it today.



Aluminum fins require less finishing when cast in Durez-bonded shell molds.

DUREZ® HOOKER CHEMICALS PLASTICS

PLASTICS DIVISION

HOOKER ELECTROCHEMICAL COMPANY

1005 Walck Road, North Tonawanda, N. Y.

Circle 633 on Page 51

ANNOUNCING

THE FIRST VACUUM CAST CONTINUOUS HEAT TREATED STEEL ABRASIVE EVER OFFERED!

TURN THE PAGE

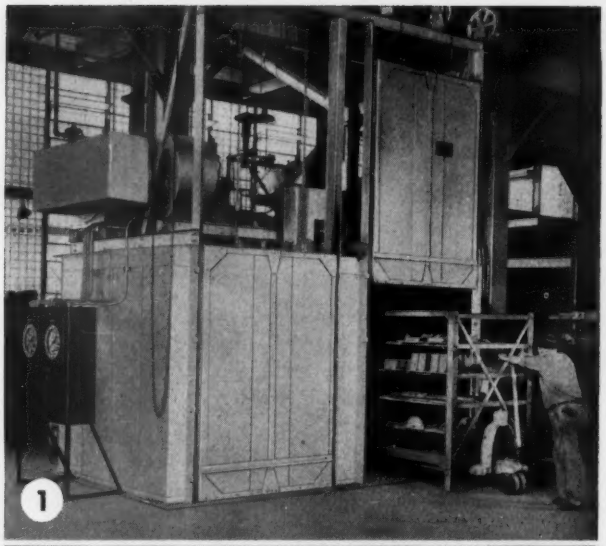
Circle 634 on Page 51

carl mayer CAN DO IT

That's right, for any baking requirement there's a Carl Mayer oven that will do the job faster and at less cost, to give you the efficiency so necessary in today's competitive markets.

The exclusive heat recirculation and slotted panel construction features cut fuel costs and heating times by as much as 50%. Uniform temperatures, assured by heat recirculation, guarantee perfect baking conditions throughout the entire oven.

Visit Us At Booth 411



THE **carl mayer** CORP.

20800 CENTER RIDGE ROAD CLEVELAND 16, OHIO

OTHER PRODUCTS: Heat Treating Ovens and Furnaces • Rod Bakers • Welding Rod Ovens • Paint and Ceramic Drying Ovens • Special Processing Equipment and Accessories

Hundreds of modern foundries of all sizes have found the efficiency and economy of Carl Mayer ovens pay off. Find out for yourself. Our engineers will be happy to consult with you on your particular problem.

1 **This rack type oven, with heat recirculation, holds temperatures within ±5° throughout the oven.**

2 **Downdraft heating method on this car type oven increases efficiency up to 50%.**

3 **This vertical oven features the special internal heat fan—increases efficiency, lowers maintenance cost.**

Write for Bulletin 53-CM

Circle 635 on Page 51

You have never used abrasive like this new

ROTOBLAST®

STEEL SHOT

1 Vacuum Casting

Electric furnace alloy steel, shotted in revolutionary new vacuum chamber for greater density, eliminating the voids and defects encountered in conventional steel shot. Gives you a fatigue resisting shot of much longer wear life.

2 Continuous Heat Treating in Controlled Atmosphere

Nothing like it in the industry. Uniform heating of every particle, in zero oxygen atmosphere. For the first time . . . ball bearing heat treating quality in a tonnage product . . . gives you uniform hardness and longer life.

New Rotoblast Steel Shot gives you much faster cleaning and the lowest blast cleaning cost ever!

Schedule an early test! Talk to the Pangborn Engineer in your area or write PANGBORN CORP., 1400 Pangborn Blvd., Hagerstown, Md.

See us at the Foundry Show

Pangborn

Rotoblast Steel Shot

Circle 636 on Page 51

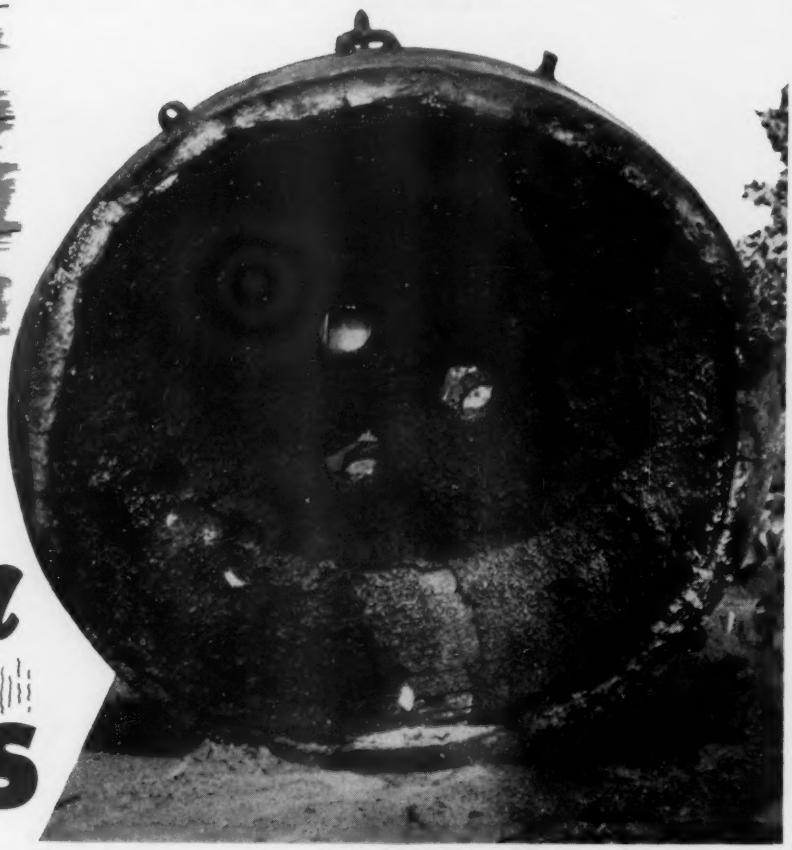
ROOF LIFE DATA FOR 1000-LB. DIRECT ARC ELECTRIC FURNACE

plastic firebrick roofs
33 heat average

mullite plastic
116 heat average

TAYCOR Ramming Mix
first roof—241 heats
second roof—254 heats

Roof of TAYCOR Ramming Mix for 1000-lb. direct arc furnace after 254th heat.



Extra HEATS

gained by TAYCOR roofs for direct arc furnace

The Fahralloy Company, Harvey, Illinois, operates a 1000-lb. basic direct arc furnace, melting 30-35 heats of heat and corrosion resistance alloys per week. Usual charge is 1500 lbs.

After changing from acid to basic furnace practice, tests were run with the following results: Silica roofs averaged 13 heats. Super-duty plastic firebrick roofs averaged 33 heats. Rammed roofs of competitive mullite plastic averaged 116 heats.

The first TAYCOR rammed roof set a record of 241 heats. The next TAYCOR roof jumped the record to 254 heats, some of them up to 3600-lb. triple sized ones.

Among the TAYCOR advantages reported by Fahralloy are:

Longer roof life
No dripping
Longer sidewall life
Less slag

Try TAYCOR Ramming Mix for your next direct arc roof. Let the Taylor field engineer in your area give you full details.

Exclusive Agents in Canada:
REFRACTORIES ENGINEERING AND SUPPLIES, LTD.
Hamilton and Montreal

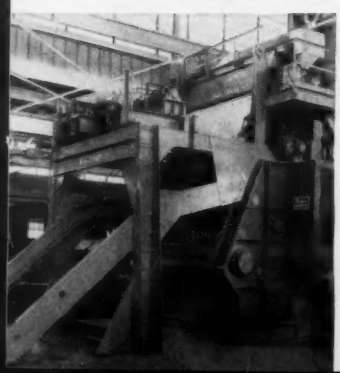
The **CHAS. TAYLOR SONS Co.**
A SUBSIDIARY OF NATIONAL LEAD COMPANY
REG. U. S. PAT. OFF.
REFRACTORIES SINCE 1864 • CINCINNATI • OHIO • U. S. A.

Circle 637 on Page 51

BUILT BIG . . . TO CLEAN BIG

Giant Pangborn unit Rotoblasts loads up to 12,000 lbs. in minutes!

A side view of the 72 cu. ft. Pangborn Rotoblast Barrel. Pangborn Barrels available in 1½, 3, 6, 12, 18, 20, 32, 72 and 102 cubic foot sizes



How do you build a giant blast cleaning barrel? If you're Pangborn, you use steel, inches thick. You put in the heaviest apron conveyor ever made. You incorporate the patented abrasive separator, abrasive-tight door, simplified Pangborn construction. You power it with two Rotoblast wheels that hurl *60 tons of abrasive an hour.*

Sure, it's tough to build . . . but it's worth it when you come up with a 72 cu. ft. Pangborn Rotoblast® Barrel! This unit cleans 6-ton loads *in five minutes* and gives the lowest operating and maintenance costs in the blast cleaning field! It's one of many Pangborn Rotoblast Machines. There's one for *your* problem.

The Pangborn Engineer in your area will be glad to take off his coat and go to work on your cleaning problem at no obligation. And for complete information on Rotoblast Barrels, write to: Pangborn Corp., *1400 Pangborn Blvd., Hagerstown, Md. Manufacturers of Blast Cleaning & Dust Control Equipment.*

Clean it fast with Pangborn ROTOBLAST®

See Pangborn at the Cleveland Foundry Show, May 19-23, Booths 2033-2037.

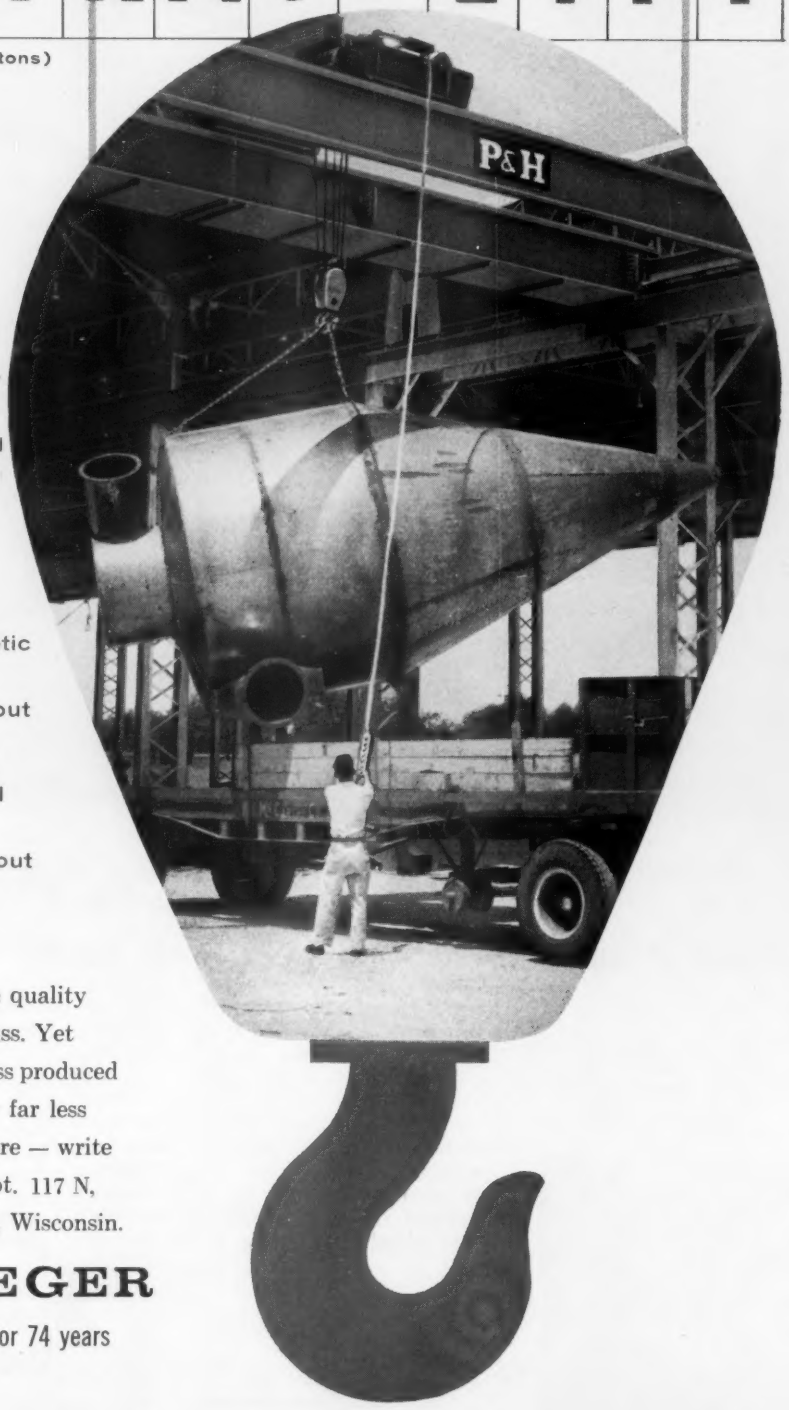
Circle 638 on Page 51

COMPARE SPECS

and you'll see why your best crane buy is

P&H TRAV-LIFT

(capacity 1 to 20 tons)



COMPARE FIRST... THEN SPECIFY

- P&H one-source responsibility for **all** parts and service
- Electrical equipment designed specifically for crane service
- DC rectifier brakes that cut maintenance in half
- Push button floor or cab operated... or both
- Variable speed 5-step magnetic control
- Anti-friction bearings throughout
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- Bridge engineered for vertical strength and lateral stability
- Heat treated gearing throughout
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Only P&H Trav-Lift offers all these quality features in the 1 to 20 ton crane class. Yet because it is standard-built from mass produced parts, you can own a Trav-Lift for far less money than you think! Find out more — write for Trav-Lift Bulletin C-51 to Dept. 117 N, Harnischfeger Corp., Milwaukee 46, Wisconsin.

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P&H ... quality and service for 74 years

Lower housekeeping costs? Pangborn Dust Control! Here's why!

Yes, this fascinating booklet *tells* you why. It tells you what Pangborn Dust Collectors have done for many different companies in many different fields. How they have cut plant housekeeping costs for these firms . . . lengthened machinery life, improved employee efficiency and morale, reclaimed material for salvage. How Pangborn can give *you* these benefits.

Why Pangborn Dust Control? Because Pangborn offers the most efficient methods of dust collection on the market. Pangborn has spent 50 years dealing with dust problems . . . experience that is incorporated in every proposal. And Pangborn's extensive line of wet and dry collectors means that one of these units can be adapted with maximum effectiveness to *any* problem.

Send for your *copy of "Out of the Realm of Dust." And remember: the Pangborn Engineer in your area will be glad to take off his jacket and go to work on your dust problem at no obligation.* PANGBORN CORP., *1400 Pangborn Blvd., Hagerstown, Md. Manufacturers of Dust Control and Blast Cleaning Equipment.*

Pangborn CONTROLS **DUST**

Circle 640 on Page 51

THE ALLOY MAN CARRIES A MESSAGE TO YOU

HE IS TRAINED AND SPEAKS WITH CONFIDENCE ABOUT ABRASIVES.

HE IS WILLING AND ABLE TO SERVE YOU.

AS A SALESMAN AND FIELD ENGINEER HE HAS TECHNICAL AND PRODUCTION INFORMATION WHICH ARE VALUABLE FOR YOU TO KNOW.

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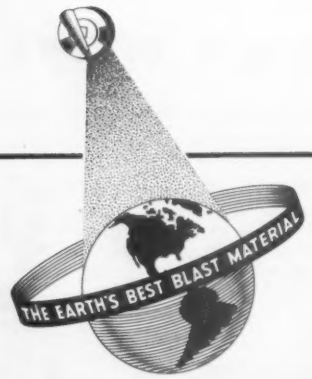
A CALL TO OUR OFFICE IS ALL THAT IS REQUIRED TO GET PROFITABLE RESULTS FOR YOU. PHONE NORMANDY 3-8529.



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HOEGANAES SPONGE IRON

a new source of metallics for the steel industry

The very first on the American market. These Ancor Sponge Iron Briquettes are virgin, soft iron of extreme purity, free from tramp elements and dissolved gases. They're time-tested and field-tested as a raw material for quality steel production, primarily in acid open hearths, induction furnaces and basic electric arc furnaces.

Hoeganaes Ancor Sponge Iron is a metallic product reduced from iron ore at such low temperature that melting of the iron or the gangue constituents has not taken place. *They have exceedingly uniform analysis from shipment to shipment.*

This is of importance too . . . the following elements are non-existent or only present in trace amounts . . . Nickel, Molybdenum, Cobalt, Zinc, Hydrogen, Nitrogen, Chromium and Tin. Ancor Sponge Iron has a very high degree of reduction—96%. It performs at least as well as a low-carbon, high-grade ingot iron.

If you're interested in *regularity of your melting operation* and *greater uniformity of your steel analysis*, be sure to write for the fact-filled literature. Better still, ask for a Hoeganaes Engineering Specialist to call and give all the facts first hand. He's at your service.

Write for literature containing basic facts, typical analysis and working data . . . ask for Form No. 113

HSIC

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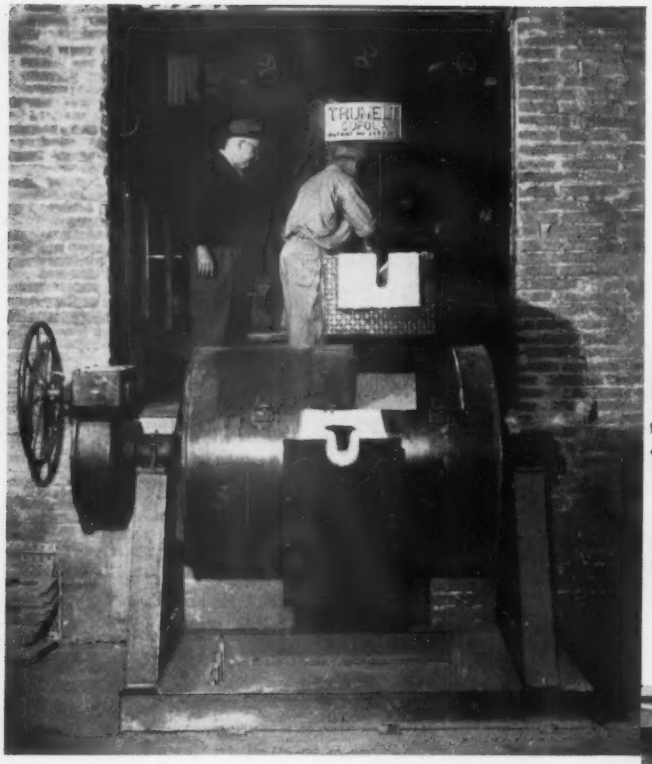


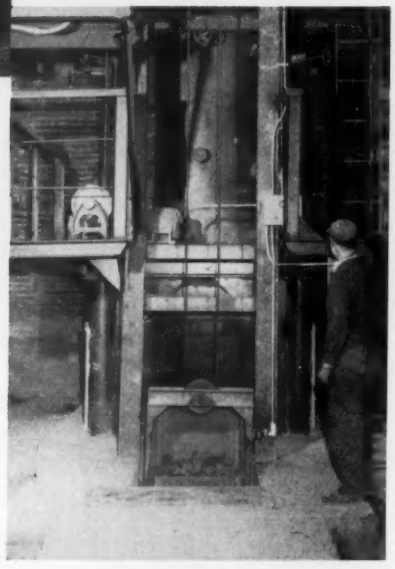


Photo at top left shows work being completed on TRUMELT Cupola, Myers Foundry & Machine Co., Huntington, W. Va. Cupola, trough and ladle are all lined with PACO Plastic.

Photo at left shows charging operation. Air flow to each individual tuyere is controlled by the valves shown in the upper portion.

Revolutionary TRUMELT *warm blast cupola furnace*

Increases Melting Rate by 50%—Uses 30% Less Coke!

Preheated air makes the difference in the TRUMELT Cupola—a new, proven concept in iron production! The result is *more* iron—*faster*—and for *less cost*. Melting rate is approximately 50% greater than conventional cupolas, and it's done with about 30% less coke. Hot iron is delivered on the *first tap!*

The TRUMELT Cupola secret lies in a unique design that preheats the air supply and cools the cupola lining—*all at the same time!* Another secret is the use of rammed PACO PLASTIC, which forms a one-piece, leak-proof lining that lasts longer because of its high resistance to thermal shock. Less downtime and greater plant efficiency is yours with a TRUMELT Cupola—regardless of foundry size. All installations and initial operation are under close supervision by experienced North State Pyrophyllite Company engineers.

Call or write for complete information, at no obligation.

BOOTH No. 409
in the arena
1958 FOUNDRY SHOW
Cleveland, Ohio
MAY 19-23

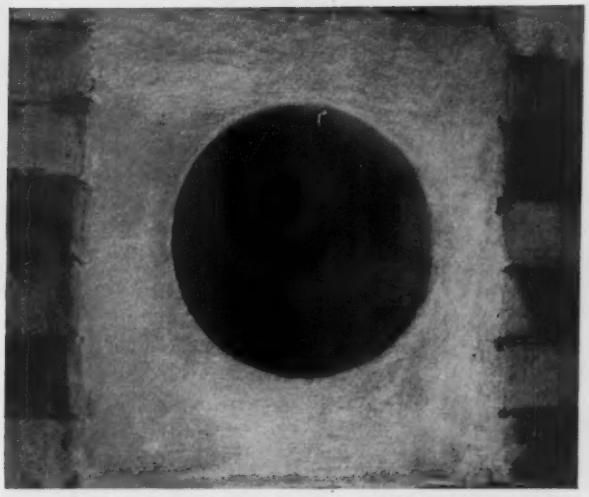
TRUMELT CUPOLA
warm blast furnace

U.S. PATENT NO. 2,593,303

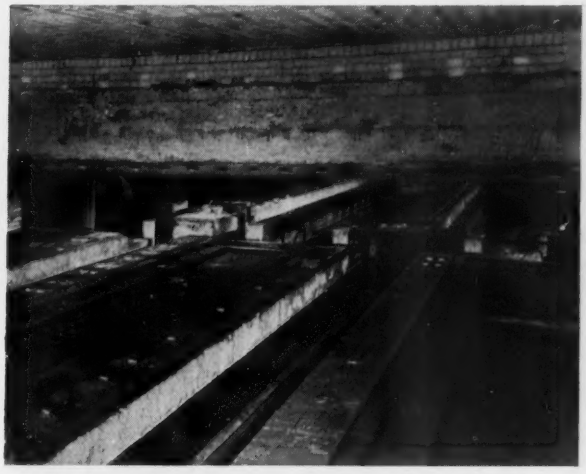
. . . research-developed for greater plant efficiency by—

NORTH STATE PYROPHYLLITE COMPANY, INC.
Telephone BRoadway 4-7055 Greensboro, North Carolina

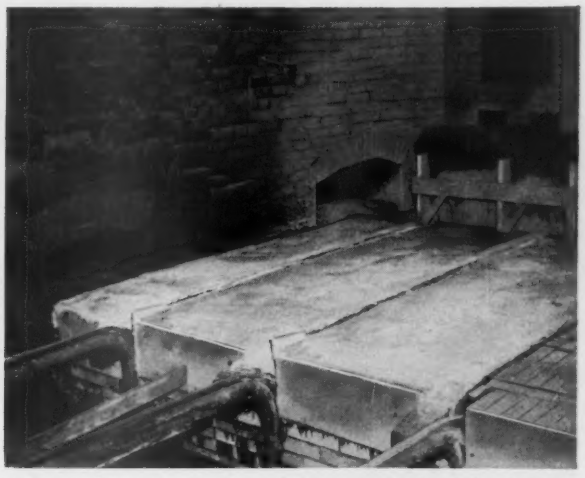
Electrode ports of this electric furnace roof are formed of B&W castable. B&W Kaocast or Kaocrete-32 can be successfully used, depending on severity of service.



High thermal release burner block is cast of B&W Kaocrete-32. Both Kaocrete-32 and Kaocast are used for burner blocks and other services in many other furnaces.



Nose arch of walking beam type furnace for heating forgings is made of Kaocast, B&W's 3000 degree castable. Kaocast is also used in forming complete forging furnaces.



Kaocrete-32 in the hearth at discharge end of a billet heating furnace. Used between alloy rails, Kaocrete-32 provides excellent resistance to attack from scale and offers savings in installation time and expense.

How B&W refractory castables solve high temperature problems

The higher temperatures in industrial processes have called for refractory castables that will stand up in these severe services. B&W offers two extremely durable, high temperature refractory products—Kaocrete-32 for applications up to 3200 F, and Kaocast with a 3000 F use limit. Both have high strength, unusual volume stability and excellent resistance to spalling and slag attack. Investigate B&W *specialized* refractory castables for solutions to your high temperature problems.

Send for a copy of B&W Bulletin R-35A. It gives additional information on versatile B&W refractory castables. R607

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars B&W Silicon Carbide • B&W Ramming Mixes • B&W Kaowool

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

Circle 644 on Page 51

"IMPOSSIBLE"?

WE STILL SELL THE

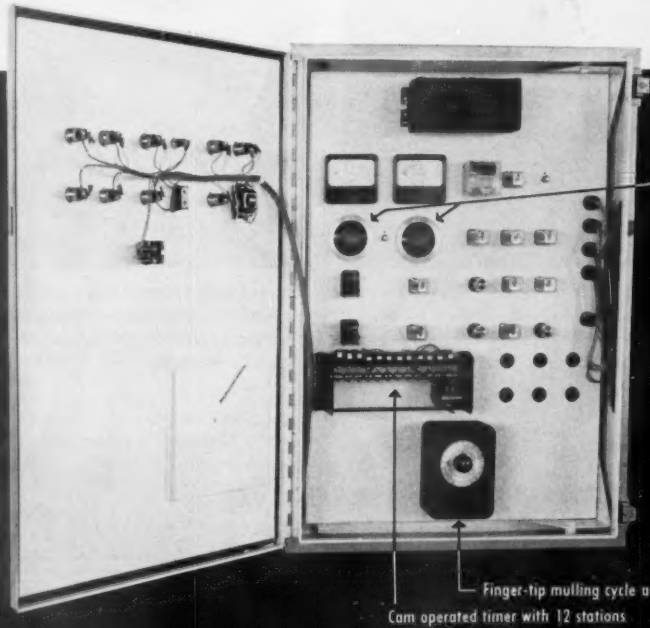
HARTLEY HYGRO-GUIDE SERIES XII

- AUTOMATIC SAND MOISTURE CONTROL
  with
- HARTLEY ELECTRIC TIME CONTROL

COMPLETE FOR

$2995.00

See this and other original Hartley foundry sand control devices at booth #2237 during 62nd AFS convention.


NEMA type 12 cabinet, 30" x 42" x 8", may be located in any convenient place, any distance from mixer.
Accessible, accurate and instantaneous moisture adjustment
Plug-in mounted relays
Finger-tip mulling cycle adjustment
Cam operated timer with 12 stations

All-electric and fully automatic sand moisture control and mixer cycle timing — the basic equipment needed for complete sand system automation — is here at a price any foundry can afford. *Results are guaranteed.*

A single probe in the mixer controls the addition of correct amount of water needed as indicated by temperature and moisture content of return sand. Hartley Electric Time Guide eliminates any chance of double-batching.

Complete particulars sent promptly

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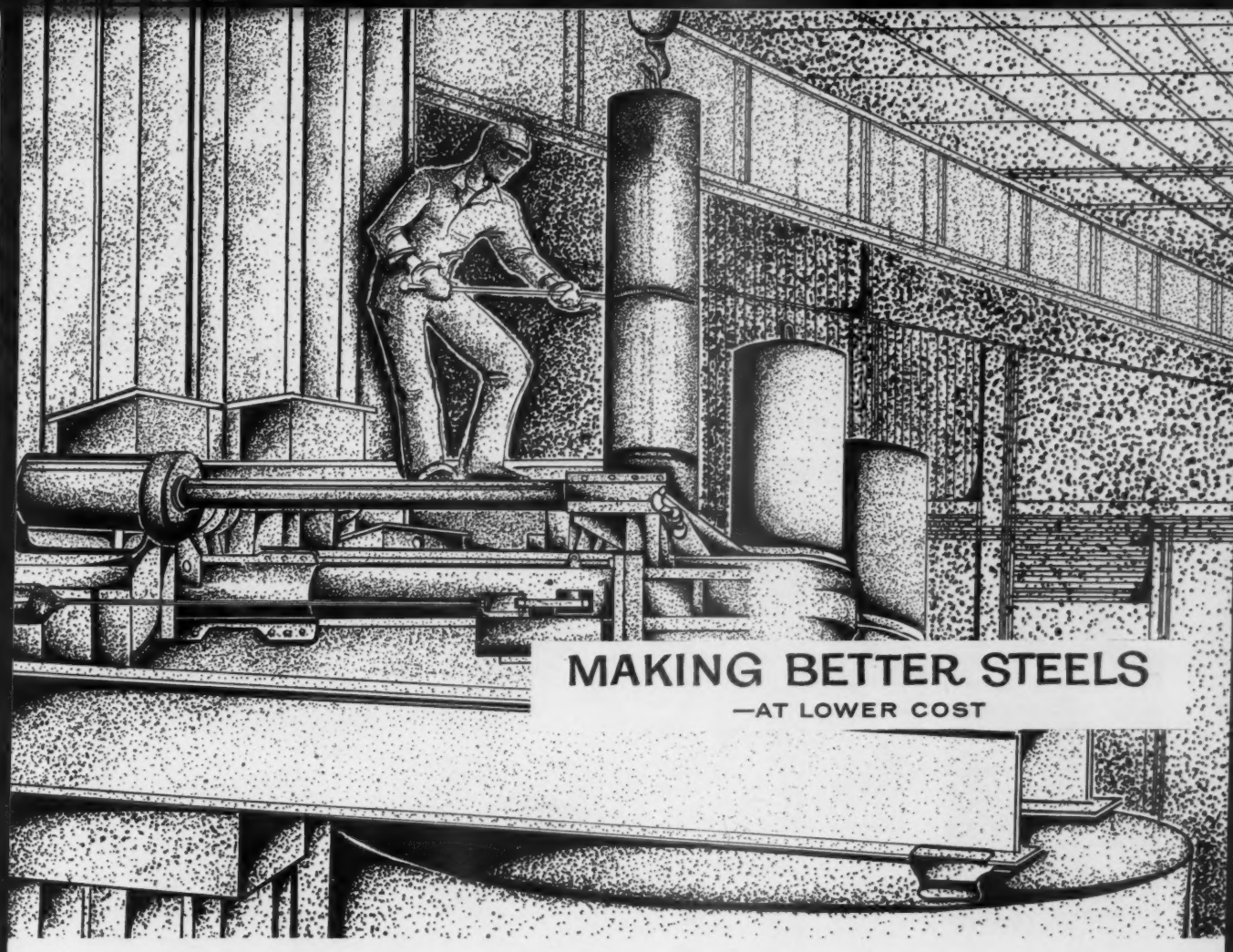


ADDING

. . . to the electrode column combines the melter's art and science of knowing how and doing it right.

The joints of a **GLC graphite electrode column** are made tighter by using the **"weld-strength" Unitrode® nipple**—a revolutionary new aid to making better steels at lower cost.

FREE—*This illustration of one of the skills employed by the men who make the metals has been handsomely reproduced with no advertising text. We will be pleased to send you one of these reproductions with our compliments. Simply write to Dept. F-5.*

ELECTRODE GLC® DIVISION

GREAT LAKES CARBON CORPORATION

18 EAST 48TH STREET, NEW YORK 17, N.Y. OFFICES IN PRINCIPAL CITIES

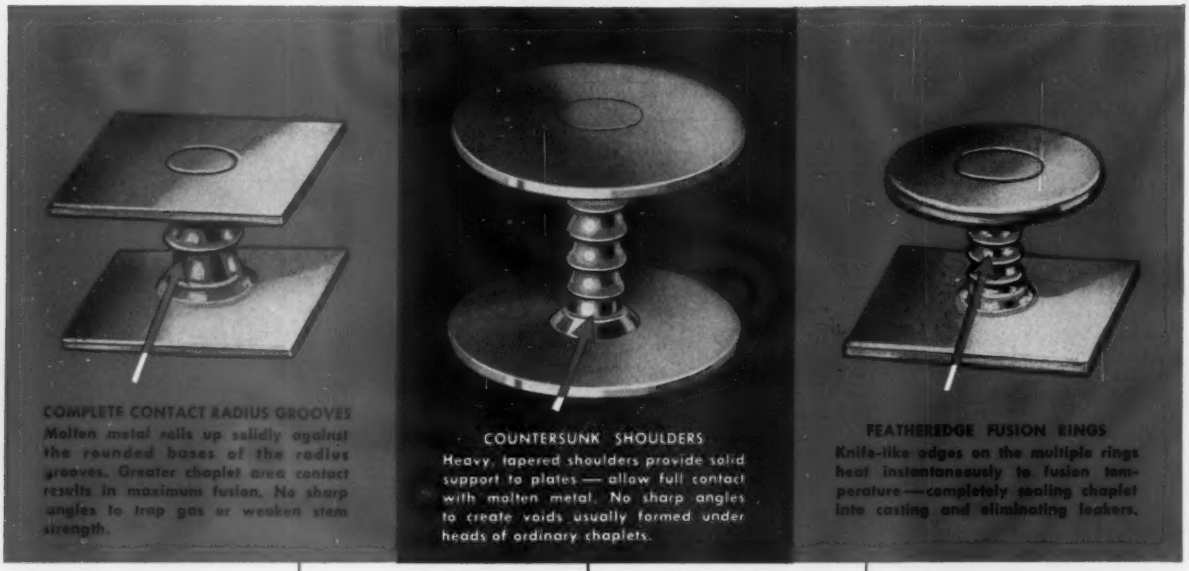
Circle 646 on Page 51

better production...less waste...

fine FANNER

DOUBLE HEAD GROOVESTEM CHAPLETS

provide maximum fusion and solid core support



COMPLETE CONTACT RADIUS GROOVES
Molten metal rolls up solidly against the rounded bases of the radius grooves. Greater chaplet area contact results in maximum fusion. No sharp angles to trap gas or weaken stem strength.

COUNTERSUNK SHOULDERS
Heavy, tapered shoulders provide solid support to plates — allow full contact with molten metal. No sharp angles to create voids usually formed under heads of ordinary chaplets.

FEATHEREDGE FUSION RINGS
Knife-like edges on the multiple rings heat instantaneously to fusion temperature — completely sealing chaplet into casting and eliminating leakers.

FULL STRENGTH
Reinforced construction at all required points provides maximum support without use of extra heavy metal.

TIN OR COPPER COATING
The surest protection against rust, as well as aid to fusion. Readily alloys with iron and steel, lowering melting point and improving fusion. Also available in pure copper.

PRECISION TOLERANCES
Held to ± .002 on most sizes. Fanner reputation for accuracy is unequalled.

WIDE RANGE OF SIZES
Fanner Groovestem Doublehead Chaplets are made in a variety of styles, in stem sizes from 3/16" to 1¼".

Fine Fanner Double Head Groovestem Chaplets are designed to take advantage of the characteristics of molten metal. Their exclusive design and superior construction assure the production of higher quality castings through solid core support . . . complete fusion . . . freedom from leakers and accurate wall thicknesses. Foundries doing critical casting work standardize on Fanner Groovestem Chaplets to secure maximum casting efficiency on every job. Find out how they can help you get better production, reduce waste and save money. Write for samples and prices now!

THE FANNER MANUFACTURING CO.

Visit us at
Booths 1408-1410
AFS FOUNDRY SHOW
May 19th-23rd, 1958
Public Auditorium
Cleveland, Ohio

BROOKSIDE PARK CLEVELAND 9, OHIO

Designers and Manufacturers of Fine Fanner Chaplets and Chills

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ARE AT YOUR SERVICE

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Readers' Comment

We Moved the University

To THE EDITORS:

In the April issue of FOUNDRY, Henderson's "Meditations of a Sandman," discusses "Concerning Olivine." He has done a fine job, because he covers both the virtues and the shortcomings of olivine as he sees them. He, of course, is entitled to his opinion, although it is at variance with some of the experience that we have had. Nonetheless, it is a fine thing to present both sides of this subject.

There is an error in the third paragraph of his column. He states, "Due largely to the work of Profs. Schaller and Snyder of Washington University . . . ." As you well know, we are not at Washington University, which is in St. Louis. We are at the University of Washington. This is an unfortunate error. In consequence, I am wondering if it would be possible to print a correction in the May issue of FOUNDRY, pointing out that the University of Washington is in Seattle.

PROF. GILBERT S. SCHALLER
Department of Mechanical Engineering
University of Washington
Seattle 5, Wash.

Should be 0.01 to 0.10

To THE EDITORS:

Your shell molding number is fine. Congratulations. But that is some vacuum range on page 154, column one of the April issue—from 0.10 to 0.10!

DR. JAMES T. MACKENZIE
4300 *Ninth Court S.*
Birmingham 5, Ala.

Colors for Cores Useful

To THE EDITORS:

We are submitting for your consideration the following suggestions which we have introduced into our own foundry; as we think it might be useful to other members of the foundry community.

We have experienced many instances where similar cores have been used in the wrong molds, and after efforts to segregate them experimented with dyes which are readily available and suitable for mixing with core sand for either oil sand or carbon dioxide cores.

It is now possible for similar cores to be readily distinguished; and in addition by using a different color weekly (we have found three colors can be used without any chance of them getting mixed) we insure that the right cores are used in the right molds and that the oldest cores are used first.

P. RASTALL
Director
J. Rastall & Son Ltd.
345 *Chester Road*
Manchester 16, England

License Is Nonexclusive

To THE EDITORS:

Thank you for publishing in your March issue our letter concerning the article in the February issue describing the pressure ladle for inoculation in production of ductile iron.

Our letter did include a statement saying that "we have an exclusive licensing agreement with International Nickel Co., etc." We should have stated that while we have a nonexclusive license from International Nickel Co., we are at this time the sole producer of these ladles under this agreement.

G. P. WHITE
Sales Manager
Industrial Equipment Co.
Minster, Ohio

Casting Lighting Fixtures

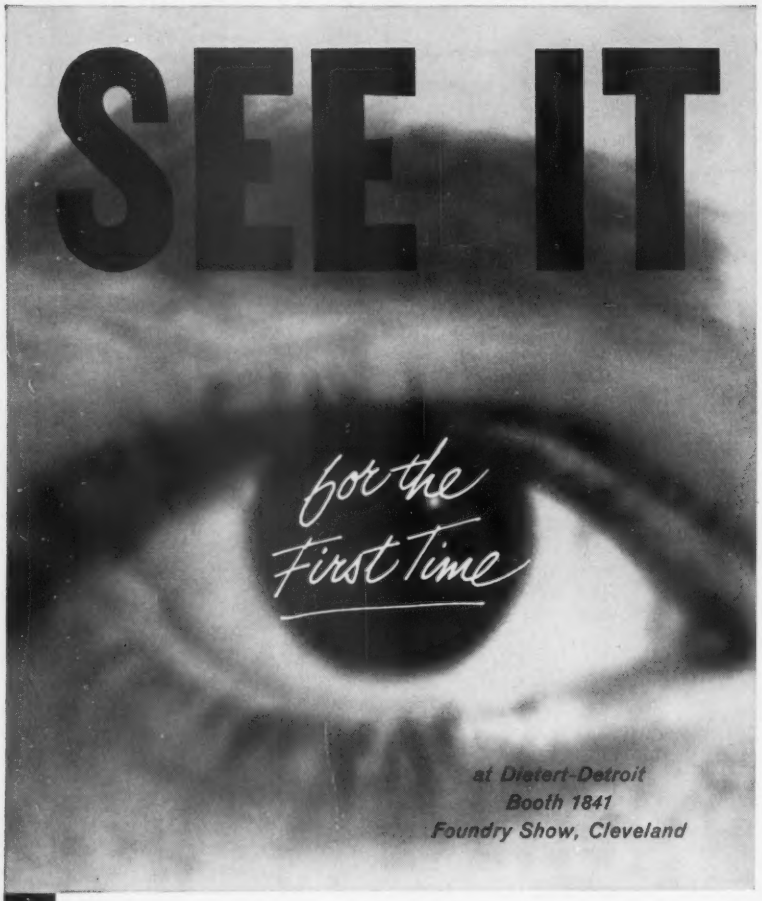
To THE EDITORS:

Practically having been born in a foundry, and being at present in the diecasting field, I still religiously receive and read FOUNDRY magazine every month and find it one of my favorite and most helpful industrial publications.

This being the case and still being a foundryman at heart, I believe I am in a fairly good position to objectively analyze the question "Permanent Mold vs. Sand" which appeared on Page 113 of the February issue.

It is our sincere belief, as you very well suggested in your answer, the permanent mold would *not* offer the electric light fixture manufacturer the competitive advantage he is seeking as compared with its present method of sand casting.

We do believe, however, that he would definitely find a remarkable advantage by having these electric



THE NEW DIETERT-DETROIT UNIVERSAL SAND STRENGTH MACHINE

Be sure to see it at the Foundry Show. It's the most advanced mold and core testing instrument available, and fits right in with today's improved foundry techniques and materials. The new No. 405 Universal Sand Strength Machine has much greater sensitivity, range and versatility than any instrument of its kind on the market. The unit features linear rate of loading on all strength tests. Ranges are as follows:

Compressive Strength for
2" dia. specimen .....0 to 5.1 psi.
(Sensitivity to 0.01 psi.)
0 to 51 psi.
0 to 510 psi.
Core Tensile .....0 to 620 psi.
Shell Tensile .....0 to 2480 psi.
Shear Strength for
2" dia. x 2" long specimen .....0 to 40 psi.
0 to 400 psi.
Transverse Strength .....0 to 360 lbs.
Shell Transverse .....0 to 360 lbs.
Green Tensile Strength .0 to 100.0 oz./sq. in.

In addition to the strength tests (left), the new machine measures green deformation — (total), green deformation at any pre-selected load, deflection of core and shell specimens and records stress-strain curve on molding sand.

HARRY W. DIETERT COMPANY • 9330 Roselawn Ave. • Detroit 4, Michigan
Send me complete information on the new No. 405 Universal Sand Strength Machine.

Name _____ Title _____
Company _____
Street and No. _____
City _____ Zone _____ State _____

light fixtures made by the diecasting process. The fact that this electrical fixture manufacturer is using a "ten-pattern matchplate" suggests that there are sufficient quantities involved to warrant the relatively small expense involved of going into diecastings.

As you well know, the low piece price obtainable in the diecasting process is by no means the only advantage to consider. We believe, therefore, that such things as good as-cast surface finish and elimination of secondary machining operations are important factors to consider.

In the last few years the leading manufacturers of electric light fixtures have switched from sand castings (and even in two cases from permanent mold castings) into diecastings where the quantities involved warrant it.

While some manufacturers have switched from aluminum sand castings to aluminum diecastings, the great majority have found it more advantageous to transfer from aluminum to Zamac diecastings. The reasons are the following: First, zinc-base alloys have better physical properties than the aluminum diecasting alloys; second, while dies for aluminum diecastings will last only for 150,000-200,000 shots at the most, using zinc-base alloys assures a satisfactory die life of millions. The cost factor, therefore, becomes of paramount importance in selection of material.

Even when weight becomes a factor, zinc-base alloys are used since much thinner walls with greater strength can be cast with them than with aluminum diecasting alloys. So far as corrosion resistance is concerned, for this particular application little difference would be encountered between the two alloys. Should corrosion resistance become an important factor to be considered, easy and inexpensive treatments for zinc-base alloys are available. Iridite, Luster-On, etc., are a few of these finishes.

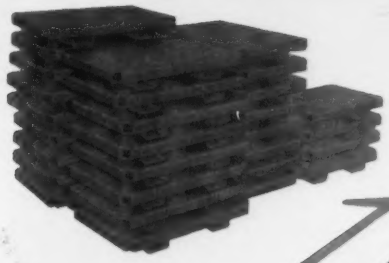
We are enclosing two samples of a part used in the electric light fixture field. The part is known as the arm and goes assembled to the shell which is the subject of the article in question. Please note the cast threads. We believe this is a typical sample that would definitely show the electrical fixture manufacturer the advantages of diecastings.

G. M. Cal
General Manager

Calko Die Casting Co.
Stamford, Conn.

Circle 648 on Page 51

Circle 649 on Page 51→



Announcing

another New Sterling product!

all aluminum squeeze-in bottom boards

made from high tensile aluminum . . .

Sterling PERM-ALUM

PATENT APPLIED FOR

To insure even greater "on-the-job" ease in handling, Sterling engineers have developed another improved product for the foundry industry. This time it's all aluminum squeeze-in bottom boards.

These newly engineered boards are fabricated from high tensile aluminum which we have named Sterling PERM-ALUM. This highly ductile alloy weighs about ⅓ as much as steel, while retaining its tensile strength up to 47,000 lbs. psi. Sterling PERM-ALUM bottom boards also provide complete resistance to corrosion.

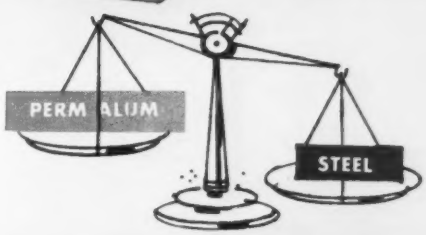
After extensive squeeze, shakeout and radiated heat foundry testing, Sterling PERM-ALUM bottom boards remain torsionally rigid . . . no fracturing or cracking, even when molds are left on boards until cold.

While available in standard sizes, 10" x 10" to 18" x 20", Sterling PERM-ALUM boards can be custom-built to meet your individual requirements. Perforations can also be provided. The boards are reinforced with welded aluminum battens and have rolled safety edges to protect the hands.

STERLING WHEELBARROW COMPANY

MILWAUKEE 14, WISCONSIN, U. S. A.

Manufacturers of Foundry Equipment for Almost a Half Century



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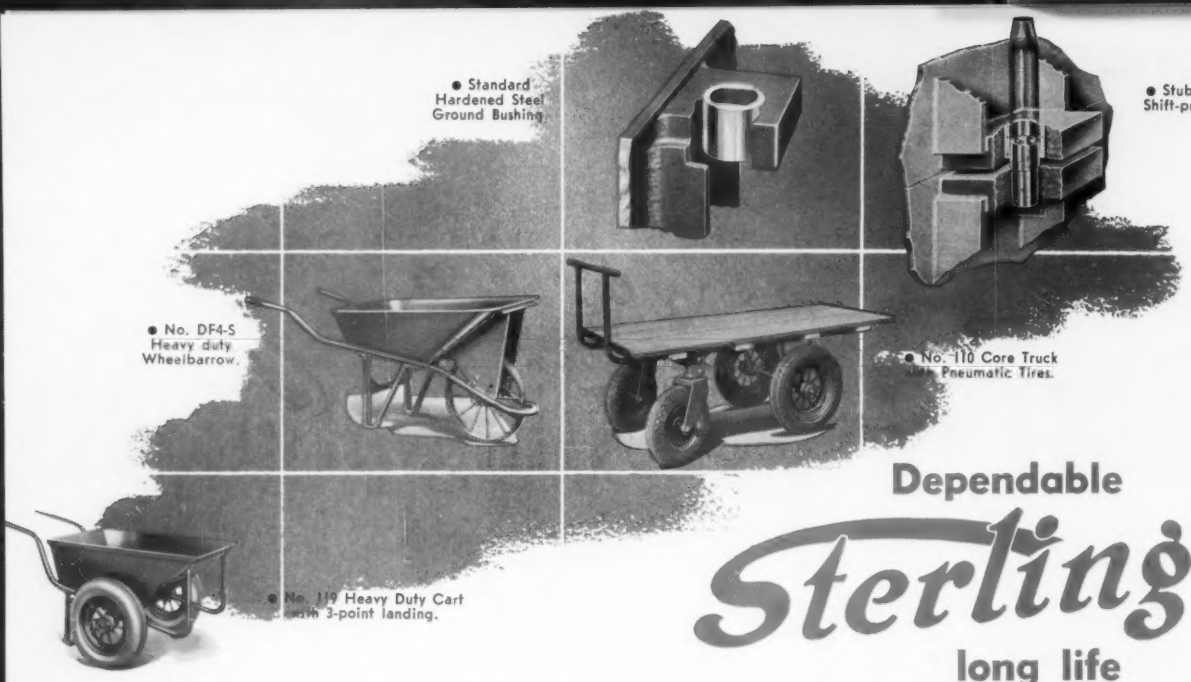

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FOUNDRY EQUIPMENT

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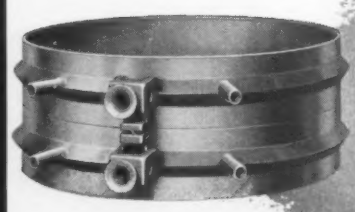

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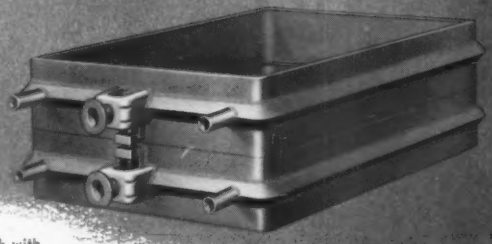

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WHEREVER METALS ARE CAST FOUNDRY

May 1958

Can You Afford It?

It frequently has been pointed out that many foundrymen are inclined to follow the practice of "using what they have." This is especially true in the matter of plant and equipment.

Several reasons might be suggested for this trait. For example, the boss who came up through the ranks often is a mechanic at heart, and he takes great pride in "keeping the old girl operating." Foundrymen realizing a low profit margin kid themselves into believing that they cannot afford better equipment.

In some instances, management may have a fear of complicated equipment and the headaches which can develop in getting a new installation into operation. On the other side of the picture, it may be that manufacturers of equipment do not sell effectively the factors of obsolescence and cost reduction.

The entire subject of obsolescence, equipment replacement, and mechanization presents an interesting problem, one which is especially timely with another AFS Foundry Show in the offing. To get an idea of industry's thinking on these factors, FOUNDRY recently asked a number of foundrymen, "Are you paying for equipment you do not have?" Manufacturers of equipment also were asked for their ideas on the subject. The interesting replies, together with other information on replacement and mechanization, are presented on the following 24 pages.

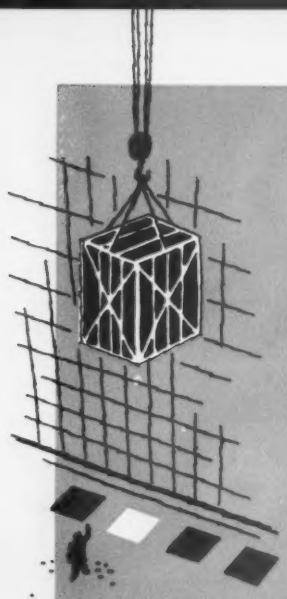
This study indicates that the philosophy of foundrymen regarding replacement of worn or obsolete equipment varies all over the lot. Some thinking is extremely fuzzy, and some foundrymen are paying little or no attention to the problem. Furthermore, the need for investigating ways of financing equipment purchases also is brought out forcibly in the study.

If foundries are to use every available means for making better castings at lower costs, this problem should receive greater consideration than it has.

As a start toward developing a better replacement program, we recommend the presentation on the following pages to all foundry managements.

Frank G. Steinebach

Editor



Are You Paying for Equipment *You Don't Have*

You are, if you are spending excessive sums to keep old or obsolete equipment in service. Here are suggestions to help you to decide what to replace and when to do it

MANY foundrymen are paying for equipment they don't have. In keeping and maintaining old or obsolete machines, they are spending the equivalent, or more, of what new equipment would cost them.

Some foundrymen recognize that this situation exists at their plants, but in some cases they feel there are good reasons why they can do little about it.

Others have capitalized on the cost savings provided by improved facilities and processes to push their competitive position to the top rank.

But a large number of foundries, because of either inadequate cost records or inaccurate analysis, are unknowingly paying for equipment without getting it.

It's Not Easy—This matter of deciding whether or not to replace old machines—and when to do it—is no easy one. By comparison, arriving at a decision to buy a new car instead of driving the old bus another year is child's play.

In attempting to develop some general principles to guide foundrymen when they take action on re-equipping, FOUNDRY sought the recommendations of a number of equipment builders and successful foundrymen. Their views confirm the fact that there is no simple, uniform approach to solution of the problem. As an example of one of the factors involved, a molding machine builder points out that it is particularly difficult to assess savings if the new unit is to be used to make castings by a method similar to that which was used with the old equipment.

"One reason for the difficulty," he says, "is that the foundry can usually buy repair parts to keep old equipment in satisfactory condition and be better off taxwise than if it made a capital expenditure for new equipment.

"Without some change in operating method, the difference in operation of old equipment in good repair and similar new equipment may not be sufficient to justify the capital investment. On the other hand, regardless of the age or condition of existing equipment, a foundry should replace equipment whenever a new method and new machinery are offered that will show a sufficient saving to cover the expense."

Two Sides to the Coin—Equipment builders emphasize the fallacy of strict adherence to a fixed payoff requirement. For instance, a foundry may demand, at the most, a four-year payoff—a 25 per cent return—before making any replacement. But if 25 per cent is a good return, why not seek 50 or 100 per cent? To realize it, all that is necessary is to defer the replacement long enough.

The trouble with this reasoning is that it overlooks the cost of maintaining the old equipment until its replacement finally yields the savings sought. And if one considers only how much he might save with new equipment, and forgets what

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it will cost *not* to retire the old unit, he can come up with the wrong decision.

One foundry says it feels justified in replacing a piece of equipment that will pay for itself in a maximum of 2½ years. It uses this general rule only infrequently, however, because other factors can be sufficiently important to cause this payoff requirement to be waived.

Other Considerations—Dollar savings through reduced maintenance and better production are only one of the things to consider in making an equipment replacement. There are also the matters of how the change will affect quality of product and ability to meet delivery requirements of customers—things that can influence future business volume.

Then there are the intangibles that are difficult to pin down with actual cash benefits. As one equipment manufacturer says, "Let's not overlook some other very important factors which may not directly affect quality, service, and price, but which can, in the long run, really pay dividends. They are: Will this expenditure make our foundry a better place for men to work? Will it enable us to compete in the labor market for real quality help? Will it prolong the working days of our people and particularly of our skilled workers?"

Age and Obsolescence—Just as no two foundries are alike, so the wear and tear experienced by a piece of equipment—and its useful life—will vary from plant to plant. This means variations in maintenance cost, which is a big factor in equipment replacement decisions.

Obsolescence also enters into the picture. One ten-year-old machine can be modern if nothing better is available, but a major design change can make even a two-year-old model obsolete overnight.

How the equipment is used is another consideration. A hand-operated molding machine has no place in a high-production mechanized line, but if it does a satisfactory job of making experimental molds on a side floor there's no economic reason for discarding it.

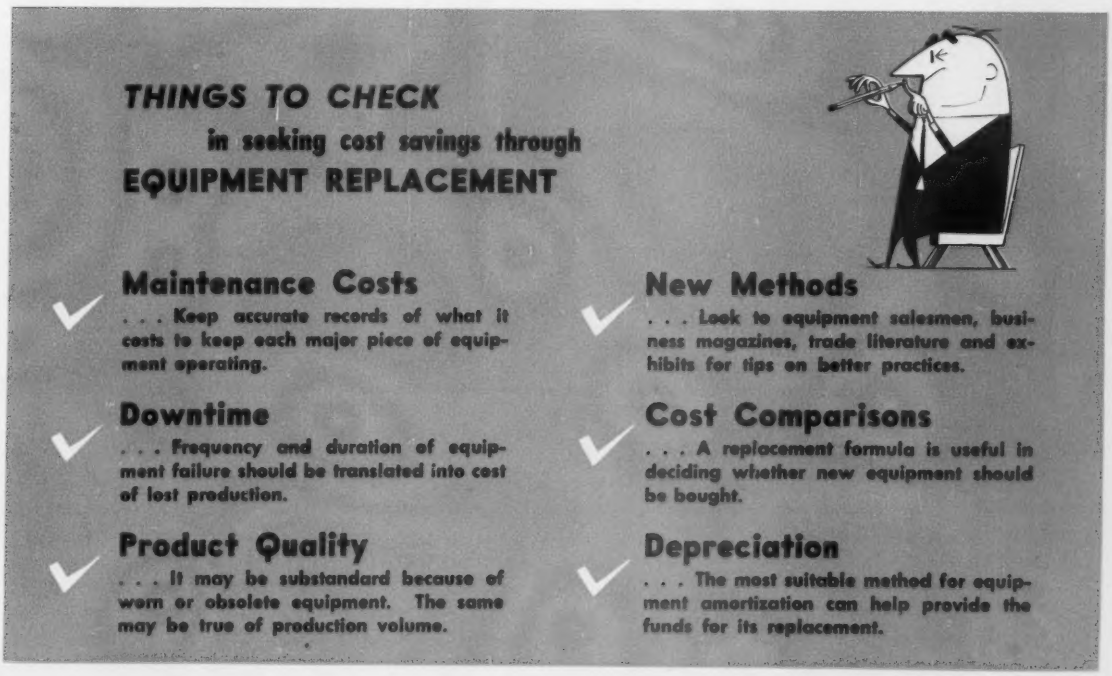
Obsolescence can affect processes as well as individual machines. Take, for instance, the small shop whose production needs are adequately met by the usual molding, pouring, and sand preparation practices employed by foundries of limited output. These practices may be considered modern for a plant of this size, but once business volume grows to a tonnage the existing methods are unable to handle, they become obsolete.

Similarly, the high-production foundry is faced with obsolescence when a machine or process becomes available which can do a better job than those it then is using.

How To Proceed—Since so many things affect the decision on equipment replacement, how should one proceed? Adoption of some effective and continuing program is only common business sense. The fact that many foundries have not adopted such a program is indicated by one equipment builder's remark that "the foundry industry today has probably the most slipshod procedure for acquiring new equipment of any industry with which we deal. The day foundries establish sound procedures will be the day the equipment manufacturer can be of greater assistance to them in improving their operations."

Here are a few things you can do:

Maintenance Costs—The cost of keeping equipment in running order is probably the most obvious signal of when replacement should be considered. One equipment firm says, "It is sensible to use maintenance cost rather than chronological age as the yardstick for timing replacement of individual


THINGS TO CHECK
in seeking cost savings through
EQUIPMENT REPLACEMENT
Maintenance Costs
. . . Keep accurate records of what it costs to keep each major piece of equipment operating.
Downtime
. . . Frequency and duration of equipment failure should be translated into cost of lost production.
Product Quality
. . . It may be substandard because of worn or obsolete equipment. The same may be true of production volume.
New Methods
. . . Look to equipment salesmen, business magazines, trade literature and exhibits for tips on better practices.
Cost Comparisons
. . . A replacement formula is useful in deciding whether new equipment should be bought.
Depreciation
. . . The most suitable method for equipment amortization can help provide the funds for its replacement.

The MAPI Formula

PROBABLY the best known and most widely used equipment replacement formula is the one developed by George Terborgh, research director of the Machinery and Allied Products Institute.

The MAPI equipment analysis method and formula is intended to answer these questions: 1. What equipment in your plant is economically replaceable? 2. On what assumptions as to the future is it replaceable? 3. What is the present cost of not replacing?

How Do Costs Compare?—Using the analysis calls for a careful and detailed comparison of operating performance of the existing and proposed equipment. The comparison will show the dollar gain for the following year that will result from substituting the new equipment. This figure also represents what it will cost next year if the old equipment is not replaced. A chart is provided to permit incorporating an allowance for obsolescence and wear in the first year's charges.

Another important value in use of the formula, of course, is to indicate when a proposed replacement should be deferred. Analysis may show that expected gains from a new unit will not be realized, and a costly investment can be avoided.

No Magic Involved—The MAPI formula—or any other method for guiding replacement decisions—is only as good as the care and judgment of those who use it. MAPI's George Terborgh says: "A formula is not a piece of magic; neither is it a substitute for hard thinking and responsible judgment. I cannot emphasize too strongly that it can be properly applied only by analysts fully aware of its built-in postulates and assumptions, and fully able, therefore, to appraise its appropriateness to the case in hand."

Literature describing equipment replacement as well as other research of the institute in the economics of capital goods, is obtainable from the Machinery and Allied Products Institute, 1200 Eighteenth St., N.W., Washington 6, D. C.

A simplified Guide for Re-Equipment, developed by STEEL magazine, Cleveland, was presented in its June 20, 1955, issue. This guide uses the MAPI chart and also calculates the gain or loss to be derived the next year from replacement.

units. One good system is to replace any machine whose maintenance cost in the past year exceeded 50 per cent of its original cost. Surprisingly, sometimes yearly maintenance costs are more than twice the original cost of the equipment."

It's wrong, of course, to base equipment replacement solely on maintenance costs of old machines, but a complete record of such expenditures is essential for an intelligent appraisal of the subject of re-equipping. Although paperwork can be overdone, no elaborate system is required to keep adequate records which will show 1) the frequency and amount of downtime for each major piece of equipment, 2) the reason for its failure, and 3) the cost of putting it back in shape.

Downtime should be recorded no matter how brief. A two-minute interruption every few hours on one unit can be more costly than a two-hour breakdown on another one. And even if these brief breakdowns do not warrant equipment replacement, recording them can direct attention to where repairs are needed.

Production and Product Quality—Check for substandard production in both quality and quantity of output. If it is traceable to deterioration in a piece of equipment and cannot be remedied permanently by repairs, replacement is indicated.

Your present equipment may be satisfactory for producing the quality of castings required today. If there is a trend toward tighter specifications, it should be taken into account in considering equipment replacement.

Keep Informed—Foundries, they say, do things the way they do because they always did them that way in the past. That's true in only isolated cases. Nevertheless, in these days of change it's important to keep informed on better ways of doing the job, whether by a different process or by improved equipment. Sources of such information include equipment salesmen and literature, technical association meetings, business magazines, and trade shows. A change in process or equipment may be indicated by what you learn from them.

Depreciation—Selection of the best method for amortizing your equipment can help provide the funds for its replacement. See Page 151 for a discussion of this subject.

Orderly Planning—Some sort of an administrative setup is needed to provide management with information on re-equipment opportunities. Its makeup will depend on the size of the foundry, type of facilities, nature of operations, and other factors. It may consist of a staff or an individual. Whatever it size, its job is to review equipment systematically—not spasmodically—and to supply management with recommendations regularly. Such recommendations should include a careful estimate of costs involved in replacement proposals, together with the cost of not making the changes.

These reports should be comprehensive, giving a complete picture of the equipment situation, so that management can prepare a re-equipment budget intelligently.

In attempting to arrive at a specific figure for the advantage in operating cost of new equipment over that of an old machine, a good replacement formula is highly useful. Several foundries say they use the MAPI formula (described elsewhere in this section) in analyzing equipment replacements, although in some cases other considerations are involved in making a decision on new equipment purchases.

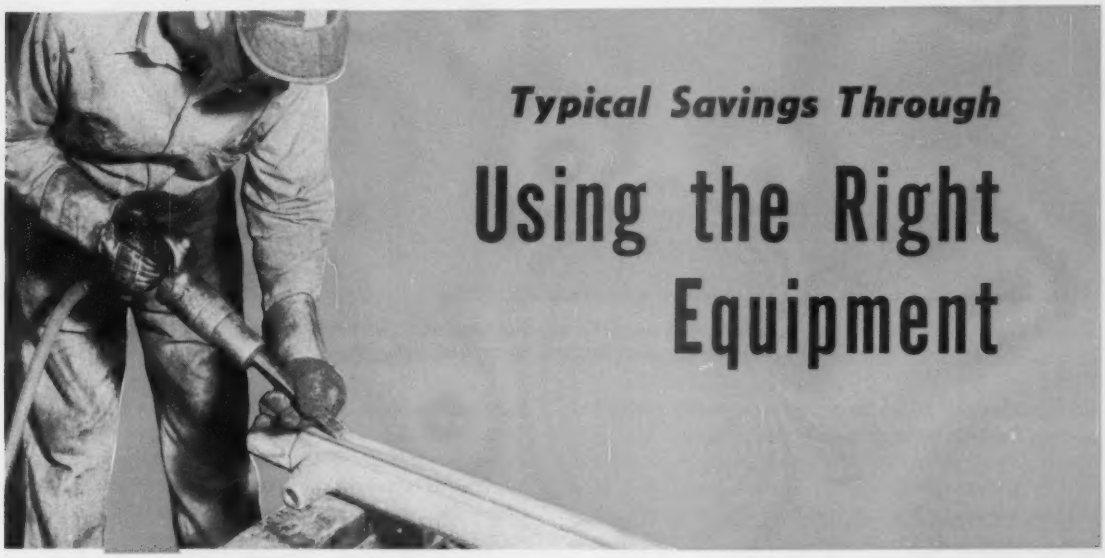
Some equipment builders also have made good use of the MAPI formula in analyzing potential savings in replacing certain facilities. Effective use of any formula presupposes, of course, that the foundry is maintaining accurate cost records. Unfortunately, too often that is not true.

Taxes Present Problem—A number of foundrymen and equipment manufacturers echo the complaint that has been heard for a number of years about the depreciation rates permitted by the government on equipment. This problem has become intensified during the recent period of rising prices. The general viewpoint of equipment builders is typified by this comment:

"We believe present allowable depreciation rates for tax purposes are too low. They favor repairs of old, inefficient equipment rather than the purchase of new machines. An unfair burden is thus placed on the equipment producer because he has to offset the effects of this tax policy. Consequently, there is little incentive for him to gradually improve his product because he needs something in the nature of a major 'breakthrough' to show enough savings to entice management into replacing old and less efficient equipment of the same kind. This tends to force stagnation and the use of unsatisfactory equipment until it can no longer be repaired.

"A more reasonable tax attitude would stimulate the capital goods industries, and while there might be a temporary postponement of tax, it would be paid eventually. It would cost the government less than it is now losing on taxes through expenses for piecemeal repairs of wornout equipment which are usually 100 per cent deductible. The present system helps make the booms 'boomier' and the slumps 'slumpier.'

"Why shouldn't the manager be allowed to amortize capital goods purchased to increase efficiency? After all, the equipment cost is nearly all labor, for the cost of its raw material is relatively small. Should it matter taxwise whether the result of that labor is an article of hard goods or a nicely bound report, for example, on methods, which if used might be in operation longer than the hard goods?"



Typical Savings Through

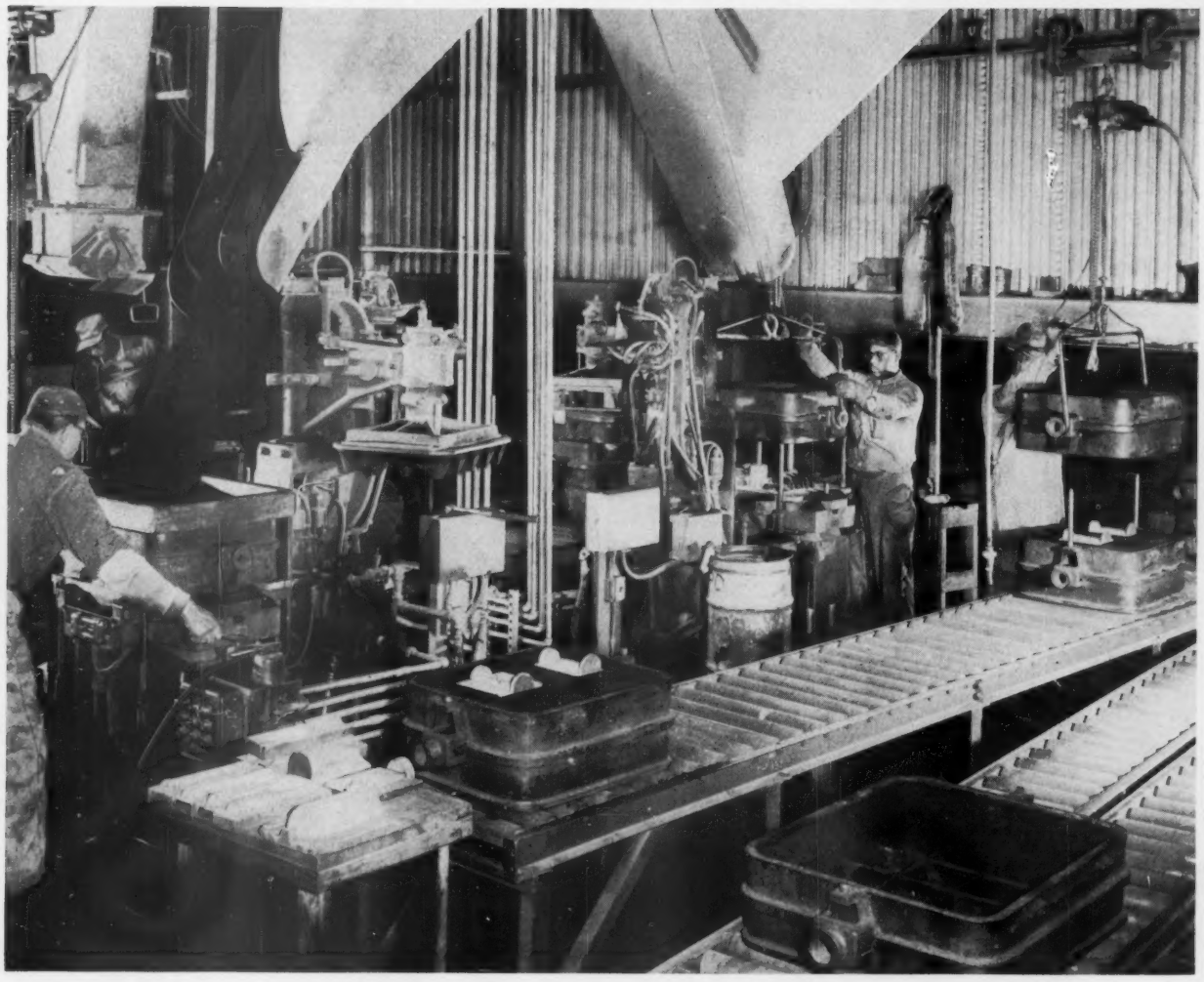
Using the Right Equipment

Don't overlook cost-saving possibilities in the replacement of small tools. They can be expensive to operate if badly worn

ACCURACY of the foundry's cost records has a lot to do with deciding whether or not to buy new equipment. Some costs are difficult to figure accurately; others are ascertained rather easily.

One item falling in the latter category is the cost of sand and other supplies. Foundries have records of their consumption of these materials and the cost. It is relatively easy, therefore, to assess the savings from new equipment that is designed to reduce the requirements of these materials. This has been an important reason for the installation of sand reclamation systems, which generally can demonstrate sufficient savings in sand consumption to pay for themselves in a short period of time. One equipment firm, for example, figures a one to two-year payoff for its reclamation unit.

BLAST CLEANING—Increased production from improved equipment can be the major factor in deciding to replace an old machine. One foundry invested $20,000 in an airless blast barrel which was able to handle twice the production previously turned out by two old units of similar type. After allowing for interest on the investment and obsolescence, the first year's operation at one-half



Judging the need for replacement of equipment only by its age is unreliable. Maintenance costs and obsolescence also are factors

the number of hours previously required yielded a saving for that year of nearly $17,000.

CONVEYING—A foundry installed a vibrating conveyor to move sand and castings from mold dump stations to a shakeout. The conveyor receives approximately 4500 pounds of sand and castings per dump at a maximum temperature of about 1500° F, and it handles 290 tons per hour. This conveyor paid for itself within a year on maintenance savings alone.

COREBLOWING—Fifteen years ago, water jacket cores for cylinder blocks were produced by a coreblower in what then was considered a well mechanized operation. One man operated the machine, a second man removed vent rods, and a third placed the drier and drew the core on a rollover draw machine. The three-man crew produced 90 to 100 cores an hour. These cores are being produced today with multiple-station, repetitive-cycle, automatic machines at a rate of 360 cores per hour. Two unskilled men place driers on the cores and move them from the machine to the core oven. Hourly production per man is approximately six times that of the previous methods.

CHIPPING AND GRINDING—Because portable tools are relatively inexpensive, foundries sometimes overlook possibilities of cost savings through replacing inefficient units. The thing to remember is that the man who operates them doesn't come cheaply. Figure it this way: If a chipping operation that requires 7 minutes can be done with a new chipper in 6 minutes, the new $110 tool will pay for itself in about 20 weeks. If a wornout portable grinder takes four times as long as a new tool to remove a pound of metal, you can invest $280 in a new one and have your money back in 3 months.

Manufacturers say that, in general, portable hand tools are subjected to more unnecessary abuse than any other type of foundry equipment. One supplier adds: "Usually, they are seldom lubricated,

inspected, and regularly serviced, so that even in a few months' time they are not performing at peak efficiency."

Another tool manufacturer, in recommending the establishment of a good preventive maintenance program, points out that a worn tool usually can be repaired and maintained with only a small loss of its original power. "Generally, however, putting repair parts back into the tool that cost more than 50 per cent of the tool's original value doesn't pay. Perhaps a better guide for replacing the entire tool is this: Compare the operating efficiency of, for instance, a new grinder with one that has been fitted with new parts. If testing shows that the new tool outproduces the repaired one markedly, purchase a new tool. It is in this realm that factory management and the service engineer can collaborate to set the best policy that will aid the maintenance man in reordering tools."

In the case of the more expensive stand snagging grinders, the foundry may be inclined to place too much emphasis on the initial cost and not enough on the operating cost. Snagging grinder manufacturers point out that these machines have been improved to give a variance in spindle speeds to compensate for wheel wear so that the surface speed of the wheel always will be at the best grinding speed. The experience of one company has been that proper grinding and correct speeds can save up to 50 per cent in wheel wear and 35 per cent in labor cost, obviously warranting replacement of a constant-speed machine.

MOLDING—One of the most important considerations in purchase of new equipment concerns amortization time. A producer of molding machines cites several case histories which illustrate that sizable investments can pay for themselves in relatively short periods.

One company installed a large jolt rollover and draw unit to produce heavy castings. Total investment for the installation, including molding machine, auxiliary equipment, and foundation, was $48,000. This entire sum was amortized in 8 months after initial operations started. The company produces twice as many castings with half the manpower required formerly.

A second company installed a two-station, indexing-type, jolt-squeeze, strip machine at a cost of $86,000. Savings permitted a write-off in 12 months. In still another instance, a very sizable installation for the production of sanitary ware was written off in 24 months. It is not unusual for amortization to be completed within 2 years.

An installation made too recently to have been amortized is interesting as an example of the type of savings modern equipment permits. Two two-station, jolt-squeeze-strip machines replaced four jolt-squeeze-pushoff units for production of cope molds and four jolt-squeeze, rollover and draw units for drag molds. The old line produced one complete 18 x 18-in. mold on each pair of machines every 60 seconds, and 56 men were required in the entire molding line. The new installation produces a complete 40 x 40-in. mold every 20 seconds with 23 men. Since each 40 x 40-in. flask holds the same number of castings as four of the 18 x 18-in. flasks, the company gets three times as many castings with half as many men.

CORE HANDLING—It often has been pointed out that the area of material handling offers tremendous potential savings in foundry operations. The experience of a large independent producer of gray iron automotive castings bears this out.

This company produces thousands of cores daily, in weights from 12 to 100 lb. Previously, these cores were moved from core ovens to finishing and to temporary storage or the molding line on manually pushed dollies. This setup required 23 men. As production increased, the company decided to mechanize the core handling operation.

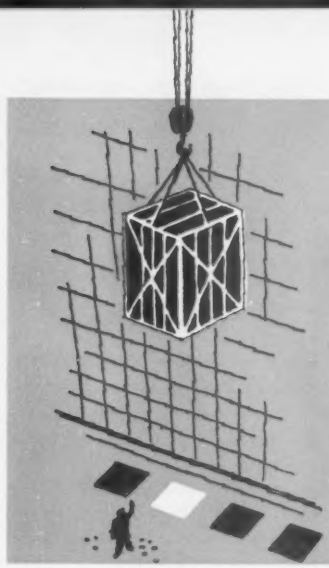
Now, cores are moved on 36 x 48-in. plywood-faced pallets with metal layer sheets. These pallets are handled by three 2000-lb capacity gas-powered trucks with 36-in. forks and load stabilizers. The entire core handling crew consists of three truck operators and six other men. Direct savings total nearly $45,000 per year, and physical labor, damage, and delays have been minimized.

SAND CONDITIONING—As noted earlier, savings made possible by purchase of new equipment often are difficult to pinpoint. This difficulty arises from a number of sources: The intangible nature of some savings, inadequate foundry cost records on previous operations, and the problem of comparing different types of operation and products. In spite of these factors, the case history of a sand conditioner installation shows definitely ascertained savings which are impressive.

The new conditioner was installed in a small gray iron job shop. It adds water, mixes sand, removes it from the floor, screens it, passes it over a magnetic separator, aerates it, and discharges it to the floor ready for use. Quality of the sand permits a reduction in the amount of facing required, and the same unit also prepares the basic facing formerly made in a muller. The latter now is used only for special facings wanted in small quantities.

Benefits include a 75 per cent cut in muller operation, a 10 per cent increase in squeezer floor output, and improved labor relations. Savings in indirect molding labor, largely attributable to use of less facing and reduced muller operation, totaled $1450 during 1957, the first year of operation for the new unit.

Metal salvaged from sand heaps by the machine was estimated to be worth at least $240. Scrap reduction savings totaled $2500, at least half of which was attributed to the conditioner by management. Net saving, after allowance for increased operating cost and depreciation for the machine, would permit its cost to be recovered in less than two years.



How Foundrymen Look at

EQUIPMENT REPLACEMENT

FOUNDRYMEN in general are aware of the importance of knowing when to replace wornout or obsolete equipment. Not all of them, however, follow a regular policy in making such decisions. Where definite policies do exist, they vary widely.

These facts emerge from a study of comments made in reply to four questions asked of representative foundrymen by the editors of FOUNDRY. Each was asked to discuss the following points:

1. His philosophy on the replacement of worn or obsolete equipment and on the further mechanization of any operation.

2. His methods of determining when machines should be replaced or when further mechanization is advisable.

3. One to three actual examples of how such a determination was made and some idea of the results achieved.

4. His general comments on this entire subject.

On some points there is general agreement. On others, opinion varies widely. There is common agreement, for example, that obsolete machinery should be replaced as soon as possible and that old machinery—not obsolete—should be replaced on a combined basis of downtime and maintenance costs. But there is little uniformity of thinking about how much downtime and how much maintenance are critical.

One of the chief areas of disagreement concerns how fast new equipment should be able to pay for itself. One company expects a payoff in 12 months, but another allows as long as 5 years. Most answers named a period of from 2 to 3 years. Many respondents complained about laws governing write-offs.

The following comments show these areas of agreement and divergent opinions:

"Management must be objective—detached from minor details . . ."

IF WE CAN determine that a piece of equipment will pay for itself in a maximum of 2½ years, a replacement is justified. This is a general rule, used infrequently because other factors affect the picture. Our dominant method of determining when machines should be replaced or the operation further mechanized is to prepare a MAPI report or similar study on the equipment. This breakdown permits a factual determination of expected versus current results.

Frequently some other reason prompts consideration of equipment buying. Replacement may be made because new equipment can do substantially more work, quantitatively and qualitatively, which the customers require. Therefore, it may be advisable to waive the 2½-year payoff period, depending on the urgency or impact on the plant operation.

An example which most nearly follows our general theory was the replacement of blast cleaning equipment used on all soft iron castings. An MAPI report made by the supplier and modified by us indicated a 1½-year recovery of the capital expenditure.

The new equipment now has been in operation for nine months. Studies indicate we are realizing a slightly better return than originally predicted. By the time 1½ years have expired, we expect our studies will be borne out about as accurately as could be expected. We expect maintenance to increase as the equipment ages, a factor which will make up for the slight advantage we now are experiencing.

Another example of replacing equipment and at the same time adding a new facility to the plant which might fall under the heading of mechanization, was the addition of a complete heat treating setup which produces pearlitic castings. With this new equipment we are able to give an immunizing treatment against galvanizing embrittlement in the draw furnace part of the heat treat instead of in an antiquated separate unit which previously had

Foundrymen describe typical policies employed to guide them in equipment replacement and further mechanization. Included are examples, information on results achieved, and general comments

been used. This permits us to make pearlitic castings instead of sending them outside to have the operation performed.

Other Factors Involved—It is impossible to apply the 2½-year write-off rule in this case because of the nature of the equipment that existed and that which was nonexistent. The gain cannot be measured exactly on an MAPI report, but must be looked at over the entire year's operation. The new equipment permits our plant to work more normal hours. The gain from this, although hard to pinpoint, certainly suggests a recovery of overhead and the additional ability to make a profit. This is what we mean in saying there are deviations to the MAPI report method in that other factors influence the decision to buy new equipment.

Another example was the purchase of sand shakeout and sand conditioner systems. This is a large undertaking and changes fundamentally our method of operation. Detailed study and engineering analyses were made of the various ways of semimechanizing the foundry, and it was determined that this particular system seemed to give the greatest advantages for the amount of money spent. The equipment was considered necessary to improve the product, primarily by better sand control. It was indicated that we could reduce the cost by producing castings with fewer manhours per ton and that manpower problems would be lessened by elimination of heavy work.

Because the undertaking was so large and affected so many operations, it is difficult to compare the results accurately with the previous procedure. By referring to one of the standard comparisons, which is the number of manhours to produce a ton of castings, we have found that the equipment has reduced our labor force and costs to the top of the predicted range. Some phases of installation proved more of a saving than anticipated and, conversely, there were some that did not live up to expectations.

It appears that we may actually meet a 2½-year payoff period rather than the longer period expected.

In judging the cost savings by utilizing new equipment, the crux of the determination lies in the proper evaluation of all factors involved in the study. Factual and practical analyses of future operations involving the equipment are essential. This thought may sound superfluous, but we feel that there are so many variables that are misread, misjudged, or misinterperted because of an overemphasis on certain details, that the tendency is to consider the purchase on the wrong set of values. Management must be objective and sufficiently detached from insignificant details to make intelligent decisions on such matters.

"A card file is maintained on all major pieces of equipment . . ."

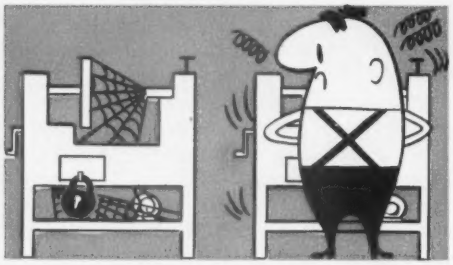
IN GENERAL, we acquire new equipment for two reasons: 1. To replace existing equipment because of failure to function, rising operating costs, decreasing quality of product, or obsolescence of present equipment due to new developments in the equipment field. 2. To add to or increase facilities to produce present products or new products.

A card file is maintained on all major pieces of equipment. It provides all information pertinent to the machine as well as a graphical representation of yearly maintenance costs. Each card also is "tabbed" to indicate a future date (our estimate of the end of its service life) at which time it is to be analyzed as to the desirability of repair or replacement. The graph of yearly maintenance costs also calls attention to any abnormal increase, which is cause for review and possible replacement. In addition, each department superintendent constantly is alert to the need for improvement in equipment. At least once each year he submits his recommendations for the repair or replacement of existing equipment or the purchase of additional facilities.

Formula Serves as Guide—In our analysis of existing equipment, use is made of the MAPI formula as a guide to aid us in determining when to replace. This formula also is employed in the analysis of different available choices compared with present methods. For example, when we considered the repair or replacement of a turret lathe, the MAPI formula indicated that if the lathe were rebuilt at a cost of $5400, it would cost $862 to operate the following year as compared with $388 to operate a new turret lathe. The decision reached was to purchase the new one.

To ration available capital more intelligently and to determine where, when, and how money spent will do the most good and bring the greatest return, we use the following controls:

1. Capital Budget Request: This is a request for any piece of equipment to be included in the forthcoming annual capital budget. Anyone may initiate the request, clearing it through the department superintendent, the engineering department, the general superintendent, and the vice president



Overmechanization at the top of a business cycle can mean idle machines later

of manufacturing. This procedure serves as a preliminary screening to rule out extravagant or impractical projects. The request outlines what is wanted, its use, and why it is being requested—cost reduction, replacement, increased capacity, new product, improved quality, etc.

2. Plant Service Order: The actual request to purchase the equipment is made by the department concerned. It initiates a more detailed analysis of the project and its cost and permits a final review after inclusion in the budget and before the expenditure of money.

3. Completion Report: This report is submitted by the maintenance department and indicates that the installation is complete and the equipment is available for production. The total cost is indicated in detail and shows whether the money spent was more or less than estimated.

"New capital equipment is predicated by general finances . . ."

IN EVERY corporation, new capital investment is predicated by its general finances. It also is influenced by prospective business—for example, securing an order for a large number of castings of any one size would justify the purchase of new equipment.

In the past we have run molding machines entirely too long. We reached a point where maintenance and efficiency of a machine did not justify further use. But when the company has overspent its capital expenditure budget, there is no means of getting approval to replace a worn-out machine.

Assuming normal operating conditions, with sufficient funds in the capital expenditure account for replacement of tools, we would proceed as follows: 1. When maintenance records indicate frequent downtime and increased expense, a new tool is purchased. 2. If a more modern tool will pay for itself by increased efficiency within two years, the old machine is replaced.

Proper replacement pays off. We installed a rollover and draw machine to operate between two jolt-strip machines. A three-man crew exceeded the production of two rollovers and two jolt strippers on the same job.

"Examine sales potentials of products made on the equipment . . ."

WORN OUT EQUIPMENT is detected by tabulating machine downtime records and maintenance records on a monthly basis. From these we calculate the approximate cost of machine breakdowns. If a poor record on a particular machine continues, we look for more modern and sturdier equipment.

Obsolete equipment is uncovered by examining the record of output in pounds per direct-labor hour, plus associated indirect labor. When the piece of equipment for a given type of casting lags below a good norm for that type of casting, we investigate for replacement. Our doors are open to sales representatives who bring to us the advantage of their particular type of equipment or new developments. We also comb the trade magazines looking for equipment which has some potential in our business.

To determine whether we should purchase equipment, we use the simplified MAPI formula. We aim to achieve a payoff in three years or less. The formula includes such things as comparison of direct labor and overhead between the two methods, the total undepreciated value of the old machine, interest value of the money invested, consideration of the rate of depreciation allowed, and other factors.

Equipment required for safety, to meet government regulations, or to improve quality also is figured on that formula, but often the purchase is made regardless of whether the formula shows an adequate payoff, for many times the indirect factor can sway our decision.

Checks Sales Potential—We do not, however, base our purchases just on these formulas. One of the most important steps is to examine the sales potential of the products made on a particular piece of equipment. This factor often is overlooked, and a piece of valuable equipment can stand idle for that reason.

Another important factor is the high cost of repair parts. It seems that the manufacturers of equipment could be more alert in analyzing repair parts records, both for improving the design to make them last longer, and in using it as a tool for sales promotional work to users of their equipment.

We examine the results actually achieved as compared with initial estimates. In fact, when a piece of equipment is delivered, the original estimate is brought out so that we can check our plans. One year after the equipment has been put in use, we check to see whether we have fulfilled our commitment.

Capital equipment purchases over $750 require approval of our general office. For equipment costing less than that, we still go through the procedure

outlined above. Two examples of recent purchases illustrate our policies in action:

1. Breakdowns and repairs on a jolting unit for a molding machine were costing an average of $115 monthly in downtime and $111 for maintenance. Estimated saving from a new machine was $2400 per year, with a payoff in six months. Work produced on the machine also was improved.

2. A study showed that purchase of a new core-blower would permit production of larger cores than on present equipment. In addition to savings in direct labor, further savings would be provided through reduction of sand wastage, faster baking due to lower moisture, and practical elimination of rods. Savings were estimated at $2600 a year on the basis of 110 tons of cores per month.

"Our company reviews its equipment on a continuous basis . . ."

OUR company likes to review its equipment on a continuous basis instead of once every year or two. This policy permits frequent consideration of the latest developments in foundry equipment.

We evaluate the economics of continuing to maintain an older piece of equipment, replacing it with a new counterpart, or replacing it with new equipment of improved design. A job study and review of the operation frequently results in a highly beneficial revamping and modernization.

On replacement of items such as molding machines where pattern equipment, flasks, etc., do not normally permit frequent, drastic methods changes, we try to follow a replacement schedule that will give maximum production and minimum downtime and maintain a high quality of product. For example, a machine which still is operational but is badly worn may cause irregular jolting, insufficient squeeze pressure, defective castings, and loss of production. Past experience and careful study determine an economically sound, continuous replacement policy.

Watch the Cycle—Further mechanization should be viewed from both the top and bottom of the business cycle. Too many foundries have embarked on full mechanization at the top of a business cycle only to discover they cannot carry the high overhead with reduced volume. Perhaps the answer lies in modernization of existing facilities which may lead into a planned program of mechanization extending over several years—one that should be able to pay for itself as it progresses.

Other factors to consider certainly include improved working conditions and safety. Establishing a good preventive maintenance program, proper plant engineering, etc., also are important.

"Our problem is to find sufficient capital for new equipment . . ."

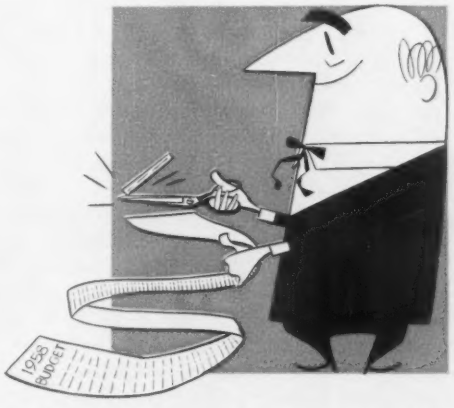
OUR PROBLEM is not to provide a systematic program of replacement of worn-out or obsolete machinery, but to find enough capital to keep pace with expansion and increased quality demands. Actually, over the last 15 years, we have never been able to come close to a 5 per cent net after taxes. Last year was our best, and although we approached that goal, we did not make it.

This situation has meant that we have increased our capacity from about 1200 to 3000 tons per month with a continuing problem of retaining sufficient money in the business to finance expansion of plant and equipment and to provide additional working capital (four times the amount formerly necessary). Necessity therefore has prompted most of the moves we have made in replacing equipment. It is apparent that this is not the most desirable policy.

Much of our equipment and many of our buildings have long since been completely depreciated, and this puts us in an unfavorable tax situation. We have a modern, well equipped plant capable of handling large tonnages, but we have not been able to follow any systematic or planned replacement program.

Maintenance Records Help—For each piece of machinery, we keep a complete maintenance record which is made into a monthly report. It gives a pretty good picture of potential savings in the replacement of old equipment as far as maintaining the plant is concerned. This information and studies of probable savings from improvement provide the data on which decisions are based. At present little equipment is replaced unless the savings for five years will equal the cost of the equipment.

Some equipment cannot be replaced, although it should be, simply because we do not have the money to do it. For example, we have three steam locomotive cranes, two of which are over 35 years old. It costs us more than $6000 each per year to maintain



When funds for capital expenses are tight, requests for new machinery are lopped off

these two oldtimers. I think we could replace both with one new diesel-electric crane for about $45,000, which could be paid for out of savings in maintenance and operation in less than three years.

Another instance of a replacement, which is now started but should have been done years ago, involves three pieces of equipment, two of which are over 40 years old. A program has been started which will replace all three. Up-to-date design will probably cut material cost one-fourth and operating labor one-third and will give control which is needed. This is a $\$1/2$ million program which again could not be undertaken until we had the money to pay for it.

"An intelligent decision requires a market analysis . . ."

CERTAIN facts must be gathered to determine when to replace equipment. Beyond that, action becomes a matter of good judgment based on experience. Many decisions to mechanize seem to be made because "the grass looks greener."

An intelligent decision requires a market analysis of the available or potential markets and determination of how long it will take to pay for the equipment through improved products, less scrap, etc. Demand for castings should permit running the equipment at full capacity and efficiency.

If new equipment will produce a superior product to help meet the competitive situation, the improvement in product quality might justify the expenditure even though it would provide little or no economy or cost reduction. Replacement of worn or obsolete equipment depends on the cost of maintaining it.

"Replacement and mechanization are necessary for survival . . ."

PROMPT replacement of worn or obsolete equipment, with further mechanization to the degree indicated, is mandatory if a foundry is to survive competition.

Equipment is replaced at these times: 1. When maintenance cost for an item consistently exceeds a calculated norm. 2. When quality or quantity of output becomes substandard because of the equipment. 3. When mechanical improvements or technological changes permit cost advantages.

These histories illustrate the above points:

When the development of coreblowers embraced core sizes and weights which we regularly produced, a study of the merits of blowing was conducted. It resulted in a change from cores made on the bench and by jolt methods—involving crane and truck handling to and from batch-type core baking ovens—to multiple coreblowing units serviced by conveyors and vertical baking ovens. A $400,000 capital outlay has yielded 25 per cent savings, including direct labor, indirect labor, maintenance, and amortization.

On another occasion, the need to double production of a large casting resulted in a capital outlay of $\$1\frac{1}{2}$ million. It involved a heavy building, two sandslingers, four mold-drying ovens, six sand mills with elevators, storage hoppers, conveying belts, and a complete sand reclamation system. Result: Production quota was exceeded, quality was improved, and costs were reduced substantially throughout all departments, including cleaning and machining.

"Our primary concern is full utilization of all equipment . . ."

HAVING foundries in several locations magnifies our problem. Each is on a profit-and-loss basis and is fully accountable, but a central functional facilities organization reports directly to the general manager. This setup helps us to attain consistency in the important categories this survey is considering and has yielded us many tangible advantages.

Standardization of types and makes of foundry equipment has simplified maintenance, for example.

Our primary concern is full utilization of all equipment with as little downtime as possible. This goal requires preventive maintenance and often the replacement of more or less major pieces of equipment prior to failure. Maintenance costs are recorded on all major pieces of equipment to determine the point beyond which further expenditures for repairs are economically unsound. Obviously, this point has no precise location. We rely on the experience and knowhow of our maintenance and manufacturing personnel.

Our attitude on mechanization is controlled primarily by the economics of each proposition and its effect on the business as a whole. At all locations, we examine and explore new methods and equipment on a continuing basis. Final decisions depend on costs savings and a reasonable rate of return on investment involved.

Seeks Smaller Cost Centers—Recently, we have been making concerted efforts to establish smaller cost centers in each of our foundries. We feel that ultimately such breakdowns of costs will enable the individual foreman to control expenses better. This information, and the assignment of equipment maintenance costs on an individual machine basis, enlarges the foreman's scope of the operation. It gives him a feeling of being more a part of man-

agement, with more responsibility and more things under his personal control or subject to his direct influence.

To appraise our needs intelligently in the light of increasing costs, we must have factual material. Although so-called calculation methods are available, we feel that each needs to be tailored to the individual company. At present, we are attempting to establish those factors which will aid our own judgment, for we feel that even with the best calculation methods, the exercise of judgment still is an important factor.

"Obsolete machinery should be removed as quickly as possible . . ."

REPLACEMENT of worn equipment should be predicated on the return on investment and attendant maintenance cost. When the combined costs of out-of-pocket expenses and depreciation reduce the return on investment below a predetermined level, it is time for disposal or replacement.

The first consideration with regard to obsolete machinery is the potential in altering or adapting to new applications. If this field offers nothing, we then dispose of the equipment through sale. Obsolete machinery should be removed from accounting responsibility as quickly as possible to reflect true operating conditions properly and to preclude penalties on profit-producing assets.

When replacing manual operation with mechanical, we look first for a saving in manpower. This saving, related to the investment, plus increased efficiency, weights the performance and indicates whether the expenditures are warranted.

Although our approach to resolving the problem of replacing capital assets is not as satisfactory as we would like, we feel that experience is providing the necessary modifications which will eventually produce the desired results.

Cost and nature of repairs are machine posted on cards bearing the date of acquisition and description of each asset. Periodically, those items having large and/or recurring items of expense are reviewed by a committee comprised of the plant engineer, superintendent of maintenance, chief electrical engineer, and superintendent of the operating department. If the asset is found to be inefficient, recommendations are made to the vice president in charge of operations for either replacement or rebuilding.

"Any equipment in use for five years probably is outdated . . ."

WE DO NOT have and probably do not need a formula to tell us when to change our equipment. Because our principal shareholders are active in the management, we have a desirable degree of flexibility and informality.

Our philosophy on the replacement of worn out or obsolete equipment often results in our paying for equipment we do not have. Any equipment or system which has been in use in our plant five years probably is out of date and should be reviewed. It may not be replaced or even upgraded at the time (economic factors being what they are), but weaknesses can at least be recognized and evaluated. We must keep up to date taxwise to do the best we can for ourselves within the limits permitted by the Treasury Department.

We feel, however, that machines should be replaced or further mechanization installed at these times: 1. When customers' long-range forecasts indicate higher production requirements. 2. When difficulty is encountered in meeting existing production requirements. 3. When maintenance and/or production supervisors can demonstrate a frequency of repair and an order of repair costs that are out of proportion. 4. When legitimate lower prices by competition are encountered. 5. Any time we can devise or buy improved machines or mechanization consistent with our requirements and save their costs within a short time.

How Savings Can Be Made—Here are several cases in point:

1. Change from the use of a tractor sandslinger was indicated as a result of customers' long-range forecasts of requirements. One mold, for example, measured about 3½ x 5 x 3 ft high and weighed 6700 lb after pouring. The clean casting weighed about 650 lb and was intricately cored. When a

Doors are open to sales representatives with news of developments in equipment

speedslinger with transfer car and a mold conveyor were installed, the operating crew was reduced from 16 men to 12, and production was increased from 8 molds per hour to 15.

2. A study of the routine blowing of a 55-lb core indicated that substantial cost savings could be made by mechanizing some of the functions. A somewhat more automated blower, complete with suitable conveyors, was installed and has cut the manpower to less than half that formerly required.

3. Critical study of the quality of castings produced within a certain size range indicated the need for better dimensional accuracy, surface finish, uniformity, and cost. We now are in the blueprint stages of installing a new, semi-automated molding unit that will produce castings of completely adequate quality, yet at lower costs.

Financing of modernization also has its difficulties. Industry in general shows in its annual profit statements a substantial portion (on which it pays taxes) which is not profit at all. Additional sums must be added to the original depreciated investments to replace an old machine even with a new one of equivalent capacity, etc.

It would be fairer if each of us could determine and set his own depreciation schedules, based on actual experience, rather than be required to use empirical figures taken from the distant past.

"Small foundrymen often do not study the problem adequately . . ."

AFTER a foundryman has established himself, he should decide whether he is to operate a production foundry or a jobbing shop. When this decision has been made, moves can be made toward mechanization or away from it. I decided against mechanization because our customers do not require high production.

Small foundrymen often do not study the problem at hand adequately or take the time to talk with others who may have had the same problem before they decide to buy a particular piece of equipment. Furthermore, they do not look over all the available equipment before deciding which to buy. Then they find that they cannot do what they wanted to. Accordingly, they have to do the job the hard way, and have a white elephant to unload at a loss.

"We examine new methods and study further mechanization . . ."

STUDIES INDICATE that, because of inflation, there is no opportunity to set up depreciation reserves during the really useful life of production equipment that will cover the cost of new equipment when it is needed.

MAPI has demonstrated that taxable income in recent years has been substantially overstated. Corporate profits in the decade 1947-56 have been overstated so that effective tax rates have averaged 7 points over the current 52 per cent corporate rates. Because many important industrial states superimpose state corporate income taxes on the federal, the true combined rate for the corporate system as a whole probably is crowding 60 per cent.

For the moment, this overstatement of taxable income is somewhat abated by the sidewise movement of prices during a business recession, but there is conclusive evidence that this relief is temporary and that there will be a resumption of creeping inflation with economic recovery. This is due largely to wage increases in excess of productivity gains. We can expect therefore a persistent excess of effective over normal corporate tax rates.

Common feeling is that tax laws concerning equipment write-offs are inadequate

Few people realize what a tax rate of this magnitude does to the incentive for new business capital investment. It requires of new investment prospective pretax earnings two and a half times the after-tax earnings needed to make the commitment attractive.

It has become evident that the main effect of such a high investment threshold is, of course, to hold an umbrella over existing productive facilities. These facilities have to get much more decrepit and inefficient before they become replaceable. Their service lives are extended unreasonably. We see more and more corporations borrowing money for plant rehabilitation, for even though they have operated at a so-called profit, they don't have the cash available for such purchases.

Our policy requires first that a machine must perform up to its required standards and efficiency, both as to accuracy and speed, to meet the demands

of the product being made. Failure to do so requires investigation and possible rebuilding or replacement.

Considerations Are Numerous—In determining when machines should be replaced, we utilize many factors, including the availability of more efficient equipment. We also consider changes in the demands for speed or accuracy and maintenance costs, which we keep accurately on all our machines, *by machine*.

We constantly examine new methods, and continue to study the possibilities of further mechanization. In our foundries we have a budgetary control system that places an incentive on cost per ton. As a result, we have no difficulty keeping our factory management actively engaged in almost continuous study of ways to reduce costs. We usually are considering a number of projects for further labor saving or mechanization.

Generally we believe that future success of all our manufacturing is dependent on continued studies in all parts of our plants of all phases of manufacturing costs, including direct and indirect labor and the mechanization of clerical functions. Incidentally, the mechanization of clerical functions ties in rather closely with some manufacturing procedures because of approaching unavailability of workers for this type of job.

It would be fine for us to act just as we see the problem, but the problem of financing such mechanization becomes acute. We are fearful that small business will suffer because of the tax pictures as related to depreciation and that they will be denied more than others the privilege of growth in spite of the effectiveness of good management.

"Mechanize any operation as far as practically possible . . ."

ANY EQUIPMENT should be replaced or completely overhauled if it decreases production or increases scrap. Whether to replace or overhaul depends on how much it would cost to overhaul as compared to replacing the machine. If the old machine is obsolete, it is advisable to replace it in any event. Consideration should be given to the purchase price of the machine and the number of manhours that can be saved because the machine has been improved.

If we find that a new machine can be paid for within a matter of 12 months or so, we generally replace rather than overhaul. We believe that any operation should be mechanized as far as practically possible. To determine this point, we will consider maintenance involved, chances of breakdowns which will impair the entire operation, and savings in manhours compared to cost involved.

Maintenance Foreman Important—We have a top-notch man acting as working foreman heading our maintenance crew. This position is, we believe, the most important one in any highly mechanized shop. This man reports any case where a machine is requiring too much maintenance or too high a cost for replacement parts. We then determine the advisability of replacing the equipment. Further mechanization is indicated if any operation is falling behind or becoming too costly because of manhours involved.

In our shop, one machine replacement involved the cupola patching gun. We had one of the first such machines, which required three men to operate. When it required a new air motor, we found new machines had been improved to a point where they could be operated by one man. We also found that the new machine was more efficient, enabling us to reduce considerably the amount of material required.

An example where further mechanization was indicated occurred in our grinding room. We found increasing difficulty keeping up in this department, requiring overtime operations. We discovered that the trouble was not grinding itself, but the inspection of ground castings. To overcome this problem, we arranged our grinding jacks in a row, installed a moving conveyor adjacent to them, and placed our inspectors at the end of the grinding line. This arrangement sped up inspection because inspectors had to keep up with the grinders to avoid piling up castings at the end of the conveyor. Results have been excellent since the inspectors not only are keeping up, but in some cases actually are ahead of our grinders.

One problem connected with replacing equipment is the 12½-year write-off we are allowed, which we feel is inadequate. When we decide to replace a machine it still is ordinarily on the books for more than trade-in or salvage value. In almost every instance, we also find that the new machine has increased in price. This factor is, of course, taken into consideration when we determine whether to replace or overhaul old equipment.

Determine where, when, and how available capital can be used to do the most good

"Replace equipment when new equipment can do the job cheaper . . ."

EQUIPMENT used regularly on production jobs should be replaced as soon as new equipment can do the job cheaper. Depreciation, repairs, speed of equipment, accuracy, and production requirements are factors to be considered. When yearly repairs approach or exceed the depreciation allowance or when repairs do not make the machine as good as new from an operating standpoint, replacement should be considered seriously if much production is involved.

Equipment should pay for itself in half its probable life. It is not safe to spread the probable savings over the full expected life. A machine may become obsolete in a shorter time, or the requirement may no longer exist. Furthermore, replacement equipment is likely to be much more expensive.

At one time we had our core machines overhauled completely at approximately 50 per cent of the cost of a new machine. Most of them broke down continually, and we had a lot of old machines which hampered production. We started to replace these machines when they were about 4 years old and stopped putting large repairs into old machines. We now have a battery of machines in good mechanical condition, and production is not lowered because of breakdowns.

Records should be kept of the cost of repairing each item of equipment, and these records should be used by management in conjunction with other pertinent information to determine when equipment should be replaced. All sectors of management should keep informed as to new equipment which could do any job in the company cheaper or better.

"New techniques and methods offer tremendous possibilities . . ."

EQUIPMENT should be discarded as quickly as possible when a better method is available, for without rapid turnover of equipment, improved methods cannot be adopted. Such improvements should provide the following: 1. Improvement in quality of product. 2. Improvement in working conditions. 3. Over-all cost reduction of the operation.

Proper cost finding must be used to determine the cost of the operation in terms of labor, depreciation, maintenance of the equipment, and use of power. Applicable factory overheads must be applied. Such information gives a true picture of the cost of the operation and measures efficiency of one type of equipment against that of another. By applying depreciation and maintenance directly to the department or cost center, we eliminate one of the curses of the industry—lack of knowledge of true costs of operations.

Molding systems which include sand preparation and distribution equipment and mold conveyors produce twice as many molds being made in a given area. The three improvements previously mentioned also result. Melting under today's methods has permitted pouring of greater amounts of iron in a given time, with improvement in quality controls, lower costs, and considerably better working conditions.

Heat treating as practiced in most production foundries has permitted doubling capacity within a given space, reduced costs materially, and improved quality and working conditions. In fact, it seems inconceivable that alert management today would not take advantage of the improved melting and heat treating equipment presently available.

Mechanization or improved methods cannot be planned until an adequate, trained staff is available. Machinery alone will accomplish little. Maintenance education likewise is important. It seems to me that reduction in operating labor following general mechanization has been offset largely by substantial increases in trained personnel, engineers, metallurgists, and technicians so that the result cannot be described as labor saving. Rather it provides a product quality improvement program, improvement in working conditions, and greater production capacities within the framework of a given area.

Managements which are not taking advantage of the opportunities of changed techniques and methods hardly will be in position to take advantage of the tremendous opportunities existing for future sales in the casting business.

"It often is difficult to decide when to replace equipment . . ."

IT IS THE POLICY of top management to keep our plants in first-class condition, including both building and equipment. We are constantly looking for a better way to perform an operation. We do not hesitate to spend money for further mechanization, providing we can see a reasonable expectation of getting our money back. Our problem, frankly, is to get our line supervisors and plant managers to seek and request the better equipment as needed.

It is often difficult to decide when a machine should be replaced because of obsolescence. Last year, for example, we took the drastic step of putting the torch to three 10-ton overhead cranes because we felt that interruptions to production, because of crane failures, and the difficulty of getting replacement parts, because of the age of the cranes, finally made

new purchases advisable. These cranes were installed last summer at a cost of $150,000. After operating the cranes for six months, we believe that if we were faced with the decision now, it would be the same, even though it would be difficult to develop a case dollarwise for justification of the investment.

Although willing to spend money for further mechanization, we generally expect to have our money back in from two to four years.

Two Examples of Savings—A typical mechanization problem occurred at a foundry we acquired. This plant had no overhead pouring devices. Past experience shows that the average molder holds down his production because of the heavy labor involved in pouring off his floor. We felt that the cost of pouring devices would be repaid quickly because of the increased production. Since installing the pouring devices, we have gone from 80 to 100 molds per man to between 160 and 200 molds on a particular floor. This is with the same operator and the same size mold.

Another example involved a core rollover machine. With our time study data and knowledge of the cost of rolling over rather large boxes, it was quite simple to calculate the savings inherent in the purchase of this machine. Since it was installed, savings have run as high as 40 per cent on individual jobs. Our figures indicate that this machine will have paid for itself in less than 12 months.

Labor represents a large percentage of our total costs, and this will go up rather than down. Competition both within and without our industry probably will get more severe. It seems to us, therefore, that to maintain or improve our relative position in the industry and with competitive processes, we have no alternative but to intensify our efforts toward mechanization. We regard it as our No. 1 problem and expect to devote more time and effort in this direction in the year ahead than ever before.

"Our philosophy is based on the cost of replacement parts . . ."

OUR PHILOSOPHY on replacement of worn or obsolete equipment is based on the cost of replacement parts. If replacement parts necessary yearly to keep a 20-year-old machine running represent 10 per cent of the original price, the unit is replaced with modern equipment.

Increasing mechanization has caused the metalworking industry more headaches than any other problem. At our company, the cost and time study departments get together on the problem of mechanization, then tell management that replacement of a given machine can effect cost savings of a certain magnitude. Without question these estimates are very close. The problems lie in other directions:

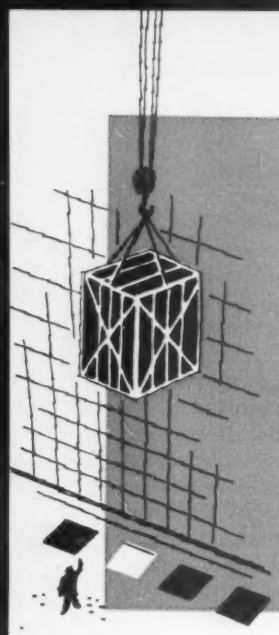
Too many equipment manufacturers have sold equipment not completely developed. As a result, the foundry devotes many months to cut-and-try, change-and-replace tactics until the machine is ready. During this period union labor will not run these machines without the past rate of pay. Six months later, when the machine is ready to go into full production, the union will not operate it at an increased rate without practically doubling the rate of pay. The foundry must compromise on pay rate and production to avoid a strike, with the result that it gets 75 per cent of the proposed production with a 25 or 30 per cent increase of wages. The original cost and time study projection is wiped out.

Two years ago, for example, we purchased an automatic coreblowing machine. We struggled with this machine, the manufacturer replaced a great many parts, and we spent a lot of money on service. The manufacturer's engineers finally developed a machine that would run eight hours. During this time we were forced to pay a certain rate and had an agreement with the union that it would be continued until this machine could be operated on a full eight-hour basis. At the end of 1957 this machine was not running, and our management committee never has been able to reach an agreement with the union that this was not a deliberate speed-up attempt by management. Other new equipment has presented similar problems.

In determining when to mechanize or replace machinery, we consider the future of the casting or part and the cost of the machine. With a $2000 piece of equipment, savings must cover cost within one year; a $5000 piece of equipment, within three years; and a $10,000 piece of equipment, within five years, We also replace equipment to eliminate hazardous conditions and to improve health and working conditions.

Industry must consider carefully before going into extreme mechanization. Such mechanization may limit flexibility so much that a major change in production can make the equipment obsolete years before it is charged off. This is particularly true in a small foundry.

Intelligent decisions about equipment purchases require analysis of markets



A Modernization Program

. . . Can Pay Its Way

An actual case history is described to indicate how certain fundamentals can be applied to permit a foundry to make the most effective use of equipment, methods, and manpower

By LESTER B. KNIGHT
President
Lester B. Knight & Associates Inc., Chicago

ARE you paying for the modernization program you have not planned and put into effect? In the face of rising labor costs and more severe competition, every foundry should review its operations objectively to plan a program to facilitate production of high-quality castings at lowest costs, commensurate with the special circumstances and requirements of the particular foundry.

A solution for one plant may not be applicable in another plant, even though a competitor. Yet there are certain fundamentals in any modernization program which can be applied in varying degrees and ways to every foundry.

Among these fundamentals are 1) standardization of flask sizes, 2) standardization of rigging to facilitate maximum utilization of available man and machine hours, 3) arrangement of facilities and sequence of operations to limit (insofar as possible) the handling of materials and product, except when an operation is performed, 4) elimination of all manual handling, where feasible, with that degree of motorization or mechanization that not only is economically justified, but provides the degree of flexibility to permit operation profitably within the cyclical swings which are inevitable in the foundry business, 5) application of facilities

TABLE I—Summary of Production Statistics—April, 1957

	STEEL CASTINGS			GRAY IRON CASTINGS		
	Bench	Floor	Total	Bench	Floor	Total
Net tons castings produced			100			89
Net tons castings shipped			134.7			105.4
Days Worked			20			16
Patterns in sand	66	25	91	91	43	134
Flask sizes used	17	20	37	15+	33+	48
Molds made	3,871	1,304	5,175	5,888	2,237	8,125
Pieces made	6,254	1,787	8,041	11,597	2,383	13,980
Gross casting weight, lb	38,248	173,212	211,640	46,912	134,804	181,716
Average piece weight, lb	6.1	97.0	26.2	4.05	56.5	13.0
Piece weight range, lb	.1–19.0	16–658	.1–658	.1–40	12–539	.1–539
Metal charged, lb			405,759			286,180
Metal poured into molds, lb	88,814	256,617	345,431	67,634	169,003	236,637
Scrap, lb			2,454	116	1,587	1,703
Metal unaccounted for, lb			28,126			3,734
Net good castings, lb			200,033	45,951	131,895	177,846
Net yield, %			49.5			62
Cores used, number	7,339	6,490	13,829	6,291	6,712	13,003
Molding man-hours	224.9	843.9	1,068.8	468.7	992.2	1,460.9
Molds per man-hour	17.2	1.6		12.1	2.2	
LABOR DISTRIBUTION	**Hours**	**Man-Hours Per Ton**		**Hours**	**Man-Hours Per Ton**	
Melting	1,071.8		10.7	668.5		7.5
Molding: Direct	1,068.8	10.7		1,460.9	16.4	
Indirect	1,586.4	15.9		2,193.9	24.6	
Total	2,655.2		26.6	3,654.8		41.0
Core: Direct	391.9	3.9		300.5	3.4	
Indirect	535.9	5.4		411.1	4.6	
Total	927.8		9.3	711.6		8.0
Cleaning: Blasting	391.3	2.9		225.0	2.1	
Torch cut off	433.2	3.2				
Chip and grind	1,303.6	9.7		797.8	7.5	
Welding	148.0	1.1				
Inspection	88.5	.7		243.5	2.3	
Heat treat	365.5	2.7				
General	580.0	4.3		266.2	2.5	
Total	3,310.1		24.6	1,532.5		14.4
General	322.8		3.2	313.9		3.5
Total	8,289.9		74.4	6,880.4		74.0
Equivalent no. men	52			54		

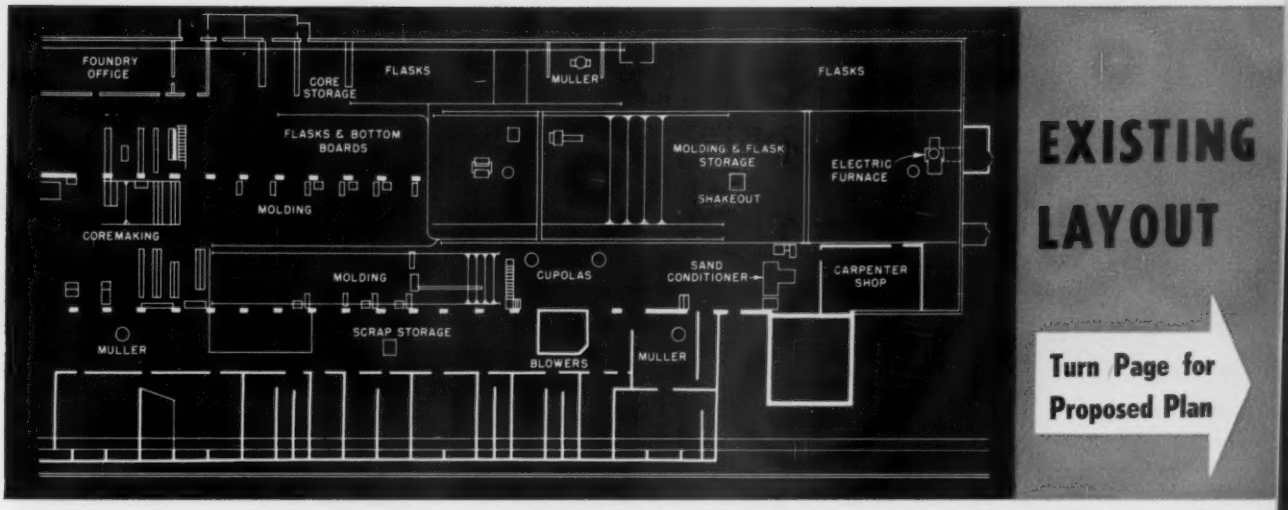


Fig. 1—Arrangement of molding, coremaking, and melting areas. Cleaning and heat treating departments (not shown) are at left

which utilize the most modern technology that is applicable and economical to the individual plant, 6) provision of adequate working conditions, 7) elimination of interferences to the ability of the men or machines to produce, 8) provision of a realistic incentive to reward a full day's work with a full day's pay and provide proper return to management and owners, 9) knowledge of costs and selling at prices to insure a profit.

How To Do It—How are the foregoing applied to a specific situation? The following discussion of an actual case history gives some indication of the method used and desirability of carrying out a program of modernization.

This particular plant is a part of a manufacturing company producing iron and steel castings for its own use, plus jobbing work. Production in recent years has varied from approximately 1800 to 3900 tons a year and jobbing work has represented 5 to 20 per cent of the total. Analysis showed that in a typical month there were approximately 91 different patterns for steel, made in 37 flask sizes, and 134 different patterns for gray iron, made in 48 different flask sizes.

Average casting weight was 26.2 lb for steel and 13 lb for gray iron, with a range of 0.1 to 658 lb for steel and 0.1 to 539 lb for iron. Taking into account all hourly paid workers, steel castings were produced with 74.4 man-hours per ton and gray iron with 74 man-hours per ton (see Table I).

Orders vary from one to thousands of pieces. During the typical month they were divided approximately as follows: Steel castings, bench molding—a total of 66 patterns were used of which 51 per cent accounted for 91 per cent of all castings, 92 per cent of all molds, and 90 per cent of total casting weight; steel castings, floor molding—a total of 25 patterns of which 36 per cent accounted for 91 per cent of all castings, 89 per cent of the molds, and 86 per cent of the weight; gray iron, bench molding—91 patterns of which 38 per cent accounted for 92 per cent of the castings, 91 per cent of the molds, and 93 per cent of the weight; gray iron, floor molding—43 patterns of which 51 per cent accounted for 94 per cent of the castings, 94 per cent of the molds, and 80 per cent of the weight.

Analysis was then made to review approximately 90 per cent of the production for a longer period of time to make certain that all previous conditions and requirements were considered. These programs cannot be developed on averages of averages, but should be based on factual conditions.

Fig. 1 shows an "as is" layout of this foundry. A small amount of brass and aluminum is produced but is not considered in this study.

Incoming raw materials are unloaded from railroad cars positioned along a mezzanine floor reached by an inclined track. Storage is orderly but requires considerable manual handling for pig iron, scrap, and coke, which is packed into wheelbarrows and piled on the mezzanine floor. Palletized materials are handled by lift truck. Sand, gravel, limestone, and iron ore are unloaded by gravity through hatches into bins having outlets on the foundry floor level.

Gray iron is melted in a cold blast cupola at the rate of 6 tons an hour. All charging is manual. Steel charges are made up manually and delivered by lift truck for manual charging into an old, door charge, electric arc furnace.

Sand Is Hand Shoveled—Floor and machine molding operations are in the main bay. All sand is hand shoveled into the flasks. Frequent pattern changes are required because of the variety of work. Molders are supposed to work at molding 6½ hours and pour off the remaining time. Observation indicated that actual molding time usually was only 5 to 5½ hours. Piecework rates, set by barter, with new jobs being priced in relation to old without any realistic evaluation of work content of the job, serve as a ceiling to productivity and a floor on wages. Piecework earnings for molders averaged $3.03 an hour; for the cleaning depart-

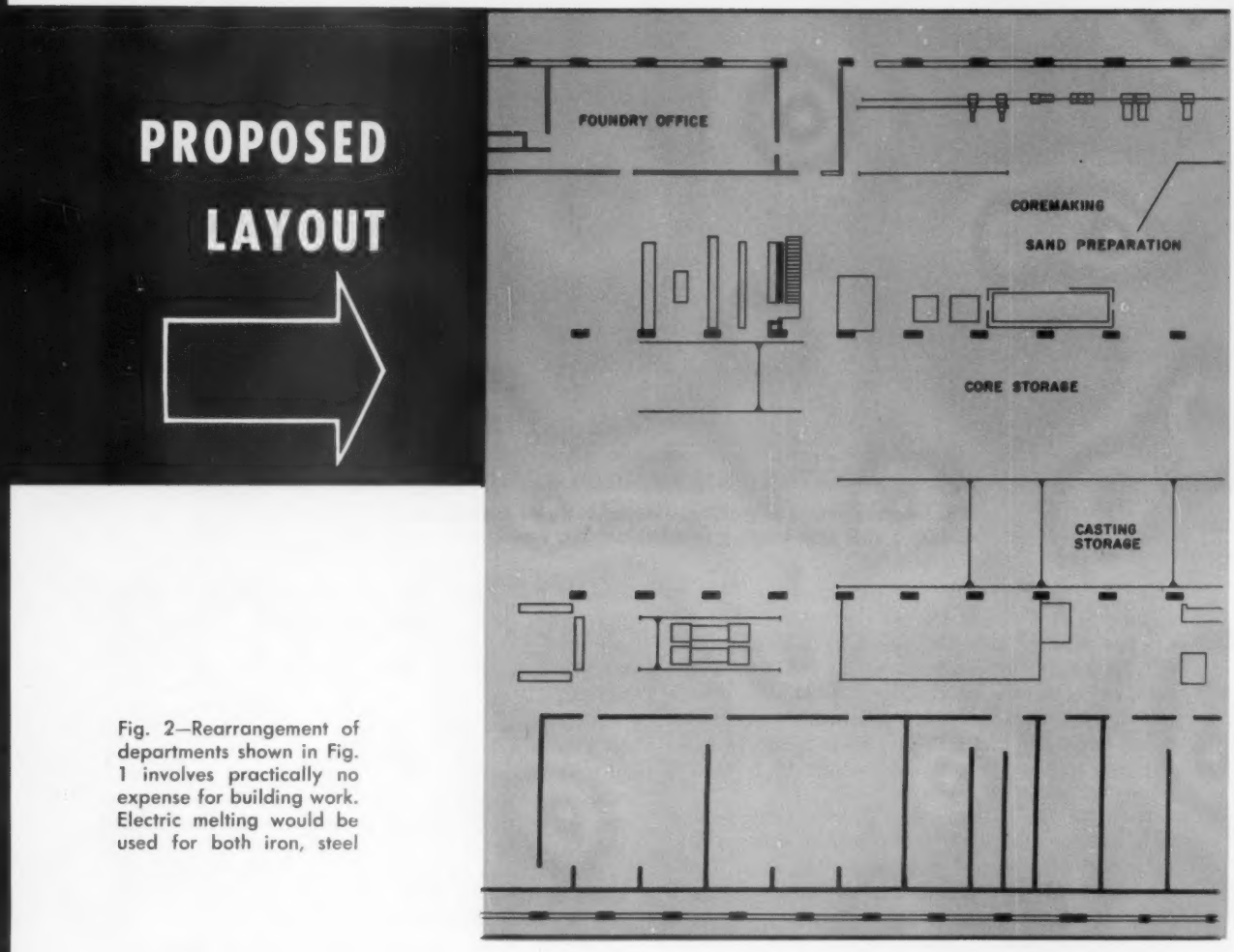


Fig. 2—Rearrangement of departments shown in Fig. 1 involves practically no expense for building work. Electric melting would be used for both iron, steel

ment $2.53 an hour; average for the shop $2.709 an hour; all, plus 22 per cent for fringe benefits.

Work areas are congested because of storage of flasks and bottom boards of many sizes (125 sizes used during the study period). Sand piles, patterns and related items also clutter up work space.

Shakeout operations are usually handled by crane, which takes stacks of molds to a raised (unventilated) shakeout. After shakeout (sand and castings are allowed to pile up under and around shakeout), flasks are returned to the floors and castings are placed in boxes or on skids for truck delivery to cleaning. Most shakeout for steel is during the day shift; for iron, at night.

Heap sand for iron and steel is tempered and cut during the second shift and piled on the floor. Facing is prepared in two mulling units (one for steel, one for iron) and delivered to the molding stations in boxes by truck.

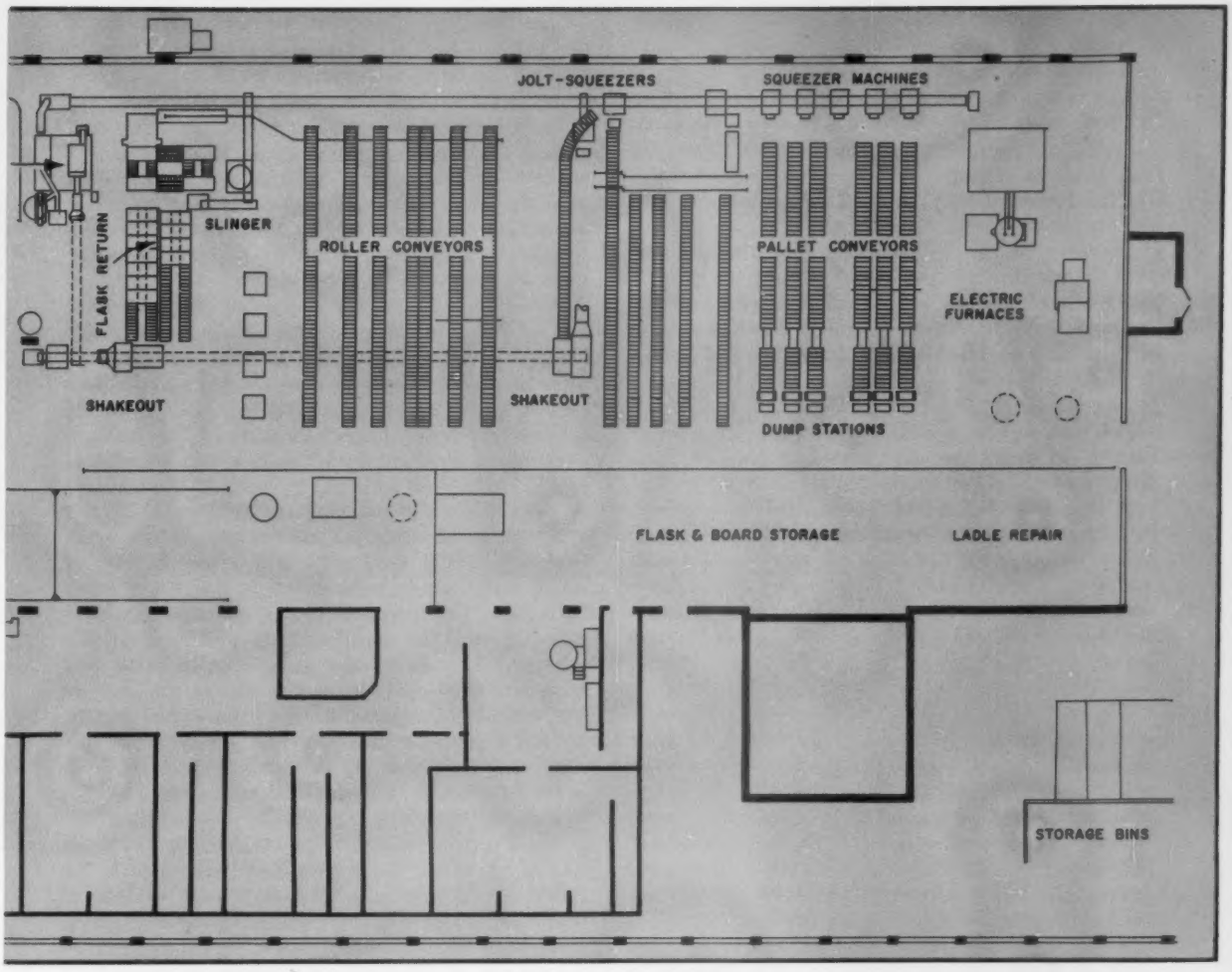
Cores are produced in wooden and metal boxes on 13 bench stations in a floor area. Coremakers serve themselves with sand prepared in 400-lb batches in a muller. Cores are baked in batch type, recirculating ovens. After finishing, pasting, and coating, cores are redried, as necessary, in these ovens. Some larger cores are CO_2 hardened, and shell cores are being made for experimental work.

Larger steel castings and certain iron castings are shot blasted on a turntable. Certain iron castings that are subject to warpage under these blast cleaning conditions are hand blasted. Small steel and iron castings are cleaned in an airless blast barrel equipped with skip loader.

After cleaning, castings are sprued, ground, welded (if needed), heat treated, recleaned, magnafluxed, gaged, etc., as required.

Proposed Program — It was and is considered fundamental that a substantial change in manufacturing approach and methods must be adopted, if the obviously inequitable piece rate system is to be replaced with a standard hour system having incentive rates which reflect the work content of the job, place no ceiling on the man's earnings and serve to encourage the producer to utilize time and machine fully.

The plant decided that a range of production of approximately 1200 to 2000 tons of steel castings a year and 1200 to 1400 tons of gray iron castings annually, of the general classes, kinds and sizes produced during the "typical" month, should be pro-



vided for, under conditions to utilize more fully the manpower and facilities. Other basic design criteria were to be: 1) one-shift operation at designed production with ability to operate longer hours and multiple shifts, 2) actual work day to be 7 hours 40 minutes, with personal time allowances, 3) 248 work days per year—allowing one week vacation and seven paid holidays, 4) operations are to be considered for 85 plus per cent utilization of available time at rated productivity.

Fig. 2 shows the proposed rearrangement of this foundry. It involves virtually no expense for new "brick and mortar."

It is proposed that all melting be in electric arc furnaces, adding a new, top-charge unit having a capacity of 2 tons an hour and anticipating approximately 1 ton an hour from the present furnace. To minimize contamination, iron and steel heats are to be run alternately. Analysis of metallics and melting supplies and materials, including power, indicate the opportunity for substantial reductions in cost of liquid metal at the spout compared with old practice and costs using cupola for iron and electric furnace for steel.

The yard at the east end of the foundry, now used for flask storage, is to be utilized for melt materials. A new 2½-ton capacity, motorized, 25-foot-long boom crane equipped with magnet and grab bucket is to unload railroad cars of metallics, etc. Sand and other materials may be unloaded by gravity into existing bins. The motorized crane is also to make up the charges in bottom-drop charge buckets delivered to the furnace area by truck. Furnaces are to be serviced by overhead crane for charging, roof and electrode replacement, etc.

Furnaces are to be lined for acid melting and are to operate as many hours as are required to pour off the molds—normally one shift.

New Requirements—The new manufacturing approach is to require a) the molders to mold a full shift, b) separate pouring crews which will also handle shakeout and service the molders, c) a central sand system providing all mulled, aerated, properly conditioned sand. (Experiments showed that the gray iron castings could be made in the sand required for steel castings, with occasional requirement for special facing. No problem was encountered with the steel castings), d) a minimum number of flask sizes is to be used, e) alloy irons as well as gray iron and steel are to be produced,

f) the same flasks and floor space may be reused during the shift, thus minimizing numbers of flasks and area required.

The combination of use of the facilities alternately and interchangeably is to provide maximum flexibility for variations in demand of different sizes and kinds of castings. At low levels of production, limited manning may be used in accordance with requirements.

A study of the castings requirements indicated that 90 per cent of the "large" captive work could be produced in four sizes of flasks instead of 50. Approximately four to five sizes of flasks are to be standardized for bench and squeezer work instead of 75 sizes.

Five squeezer or bench stations are to be provided with overhead sand to produce at an average rate of 25 molds an hour from four stations. The fifth station is for flexibility, unusual conditions, and anticipated increase in volume over design criteria. Provision to store up to 125 molds provides flexibility for the different analyses of metals and intermittent pouring. After pouring and cooling, castings and sand are to be dumped into boxes for delivery to the shakeout. Pallets and bottom boards are to return to molders by gravity on return lines located under the pouring lines.

Two jolt-squeeze machines are provided for cope and drag work—approximately 22 molds an hour in two flask sizes. A pin-lift is to be used for copes and rollover-draw for drags for maximum flexibility. Machines are to be serviced with overhead sand handling, and mold storage facilities are provided for closing and storing up to five-hours' rated mold production. Machines are to be manned to produce up to the machine capacity, as required.

For the great range of floor and larger machine work, a No. 9 slinger unit (pulpit control) is to be used to sling the molds in two sizes of flasks (normally).

Sand from Central System — The central sand system is to clean, screen, control fines, condition the sand by mulling, and deliver it after aeration to the molders' hoppers. All sand is to be prepared in the one system because tests have demonstrated that all castings may be made in the steel sand, except a few light-sectioned gray iron jobs requiring special, fine facing for surface.

The coreroom is to be relocated, as shown. Sand is to be delivered to the coremakers' hoppers in a bottom dump hopper, traveling on a monorail. Up to 15,000 lb of core sand per day are "normally" to be required.

A study of coreboxes and rigging permitted the changes to use one bench core blower, one floor core blower, two rollover-draw machines, three bench and one floor coremaking areas. Present ovens are to be relocated and service and storage areas rearranged to minimize handling and permit coremakers, etc., to produce full time. Approximately 2400 cores per day are required.

Cleaning and finishing is to be rearranged and a friction saw installed to cut off heads and gates on approximately 70 per cent of small steel castings to reduce grinding and chipping substantially.

New stand grinders with variable speed control and pressure bars are to improve grinding speeds.

When production warrants, a turnstile type, three-wheel blast cabinet (25 hooks per hour capacity) is to be installed to clean larger castings. Two shot storage tanks are to permit use of fine shot at low velocity for critical iron castings and heavier shot at high velocity for steel and other castings. This equipment is to eliminate a manual blast room where two men work in highly undesirable conditions.

When the changes are completed, the work content of all incentive paid jobs will be entirely different. These changes require that the old price rates be abolished and new, equitable, realistic rates be evaluated and applied. This results in increased take-home pay but lower unit costs for the castings.

Increased Productivity—The proposed changes at rated capacity are to result in an over-all reduction in man-hours per ton of good castings of 30 per cent compared with former operations. In addition, substantial reductions will result in cost of liquid metal, sands, bottom boards, flasks, and other materials. The increased total production results in a lower cost per ton for fixed and semivariable expense. The direct cost reductions in labor and materials are equivalent to the cost of the changes and additions in approximately 4 years of operation.

Such a program should be and is planned to permit implementation on a step-by-step basis, over a period of time, and with minimum interference to production.

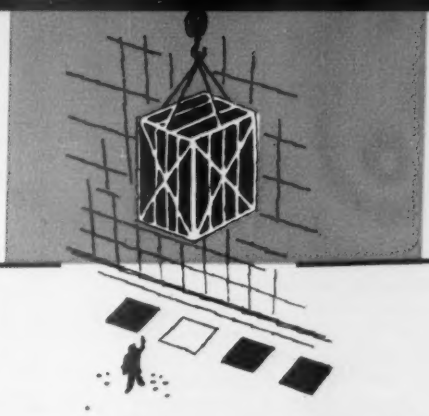
Many other studies have resulted in programs which, at times, have permitted recapture of the entire cost of the changes in one year, or less, of operation. The majority of the programs which have been recommended have permitted cost reductions equivalent to the capital expenditure in 3 years, or less, of operation.

While the foregoing has discussed essentially the adoption of substantially different methods and facilities, including a different manufacturing approach, there are many instances, where, with the co-operation of labor and management, old inequities are eliminated and improved utilization of existing facilities and manning result in substantially increased productivity, lower costs, and higher earnings for labor, management, and owners.

It is axiomatic today, in our way of life, that production is the true measure of wealth. Anything that restricts the ability of the worker to utilize his time and facilities fully and effectively for a full day's pay is undesirable, and, ultimately, jeopardizes the ability of the company to be a fine place to work, while remaining competitive and profitable. Experience shows that management and labor cooperating to insure full productivity at fair wages insures an adequate reward for owners, management, and labor and contributes to the economic progress of our country.

Are you paying for a modernization program by your failure to fully utilize your facilities and manpower and to provide the most modern facilities and methods suitable for the requirements of your business and within your economic resources?

By RALPH L. BERRY
American Appraisal Co.
Milwaukee



Proper Depreciation Helps Finance

EQUIPMENT REPLACEMENT

Since depreciation contributes a large part of the funds for equipment replacement, its proper accounting is highly important. Here are some suggestions on making the best use of present regulations

A REVIEW of the machinery and equipment advertisements in a recent issue of FOUNDRY reveals that the benefits claimed by the suppliers included the following: "Speed production-cut molding costs," "50% faster," "outwears any other brand," "reduce costs by as much as 50%," "25% increase in cutting efficiency," "minimizes rejects."

Such claims, when made by reputable manufacturers and capable of substantiation, cannot fall on deaf ears in the highly competitive foundry industry where success—and even survival—depend on the constant efforts of management to improve quality, reduce waste, and cut costs.

Because the foundry industry is highly competitive, it is not surprising that in recent years there has been a marked improvement in production methods. Contributing to this improvement have been the development of more efficient machines and equipment and the introduction of a greater degree of automation to offset constantly increasing labor costs.

Many leaders of the industry have recognized the need for modernization and have contrived in some manner to achieve it. Others who are operating older plants with low depreciation costs may think they are better off than they really are. Still others may be concerned over the obvious obsolescence of their equipment but hesitate to spend the amounts required for modernization, particularly if it has to be done through debt financing.

The question is frequently raised: "Are we using our machinery too long?" Recent surveys have indicated that we are—that much of the equipment used in metalworking plants today is old and obsolete and should be replaced. If this is true, then why is it true?

Much of the reluctance of management to replace old equipment arises from inflexible depreciation

DEPRECIATION METHODS

Straight Line—

Depreciation is computed with a fixed percentage figure equal to one year out of the useful life of the machine. If the machine has a useful life of eight years, the depreciation each year is ⅛ or 12.5 per cent. That per cent of the original cost—$125 on a $1000 machine—is subtracted from the balance of unrecovered cost each year.

Declining Balance—

The depreciation percentage is computed in the same manner as for the straight line method. Subtract double that per cent of the original cost of the machine the first year. In subsequent years determine the amount of depreciation by applying the double percentage to the balance of unrecovered cost. Subtract that amount from the unrecovered balance. Later, when the balance is small, or at any time you wish, you may change to the straight line depreciation method. This change from one method to another is the only one which may be made without permission of the Internal Revenue Service.

Sum of Digits—

The depreciation rate of a machine is based on the sum of the estimated years of its useful life. Assume a life of eight years. The sum of the digits is 36, obtained by adding the figures 1 through 8. The depreciation rate for the first year is 8/36 of original cost; the second year it is 7/36, and so on. This method does not provide quite as much depreciation for the first year as the declining balance method but in subsequent years it provides more.

This property ledger page is useful for maintaining depreciation records. It is used here for one item or asset but also can be used to control general classifications of property. Back of the sheet is shown at the far right

ACCOUNT		UNIT NO.
CLASS'N	Machinery	
PLANT		
DEPT.		
BUILDING	1	
FLOOR	1	
DATE	12/31/57	
REFERENCE		

		COST OF REPRODUCTION NEW		DEPR. %	COST OF REPRO. LESS DEPR.	
1	Whiting Corporation Standard model B #9 continuous melting cupola - Ser. #6315 - section E 65' high - 84" dia. shell - 13'6" high bottom plate to charging door - 9" lower and 4 1/2" upper brick lining - 4'2" high cupola columns - standard #9 spark arrester - standard #9 roof hood - set bottom door props and hoist	14,305	00	10	12,874	50

HISTORICAL RECORD — DATE FULLY DEPR. 1980

DATE	REF.	IDENTIFICATION	COST		RESERVE		UNREC. COST		REM. LIFE	ANNUAL DEPR.	
1955			12,417	00							
12/31/57		Computed Reserve			1,241	70					
12/31/57		Balance	12,417	00	1,303	79	11,113	21	23	483	18

policies which fail to recover the full cost of an asset over its useful life. Management is hesitant to discard obsolete machinery which has a book value of 30 or 40 per cent of the original investment. This is at least one of the roadblocks to an aggressive modernization and replacement program which could be avoided by improved depreciation accounting methods.

If the equipment is old, maintenance costs high, and operating results unsatisfactory, modernization may provide the key to a correction of these conditions. If a study reveals that new and improved equipment will, in fact, "speed production," "cut costs," and "increase efficiency," then the time has come when something needs to be done.

Where Will the Money Come From?—Once it has been decided that modernization is necessary to restore adequate earnings, the problem of financing such a program is immediately posed. Inflation and high income tax rates aggravate the problem. The cost of replacing equipment in like kind may cost two or three times as much as the depreciation reserves which have been accumulated on original costs, and the improvements introduced in the new models will usually add materially to the costs of the new equipment.

The funds needed for replacements and modernization may be generated in part by the annual depreciation provision, which is tax free, and supplemented by earnings after taxes retained in the business for this purpose. Unless substantial replacement reserves have been accumulated over a period of years, it is probable that some new financing may also be required when a modernization program is adopted.

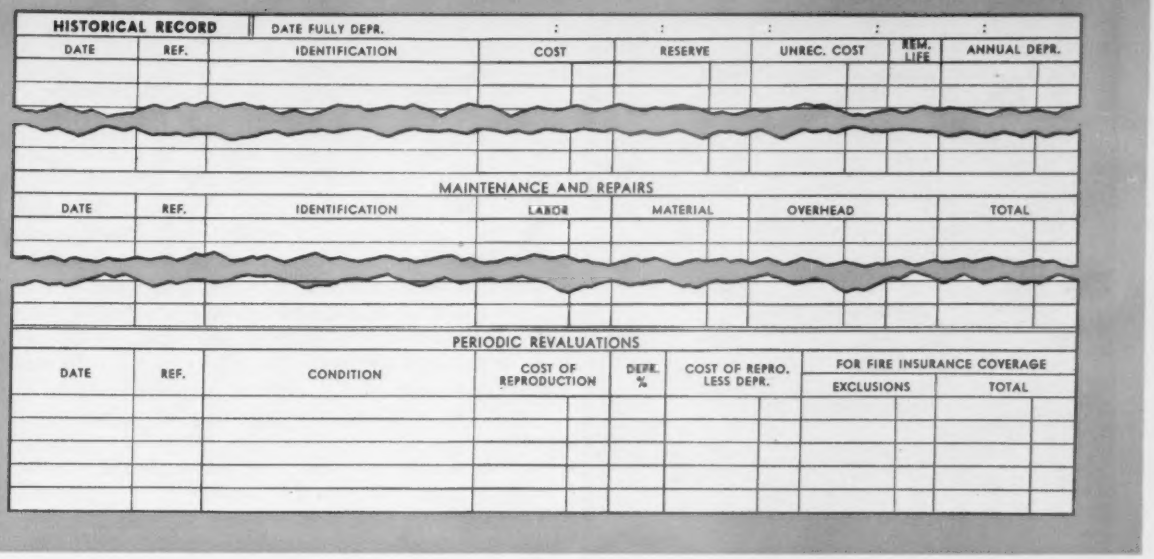
The importance of the depreciation charges as a source of funds for capital expenditures is indicated by the fact that whereas capital expenditures by industry in 1957 are estimated at $37 billion, the depreciation taken in that year by corporations was in the neighborhood of $18 billion.

Accounting for Depreciation—Since depreciation contributes a substantial portion of the funds expended for replacements and improvements, the proper accounting for depreciation is highly important. It is to be hoped that the Congress may eventually amend the tax laws to increase the depreciation base, but until such action is taken, the taxpayer must do the best he can under the existing laws. Not all taxpapers are taking the maximum advantages afforded them by the present laws.

The Revenue Act of 1954 afforded some measure of relief through the specific authorization of the double-declining balance method and the sum-of-the-digits method of depreciation. These methods permit the taxpayer to recover his investment more rapidly during the early years of life of an asset, although they do not increase the total amount recoverable. Nevertheless, they tend to increase the cash flow in those years immediately following heavy capital expenditures. Many companies have found it helpful to use one or both of these methods in their tax accounting. It would seem that any company with heavy investments in depreciable assets should consider carefully the advantages of these methods before ruling them out.

The importance of obsolescence as a factor in computing depreciation is recognized by the new regulations. They distinguish between normal obsolescence, which may be reasonably anticipated and reflected in the estimate of useful life on which depreciation is predicated, and extraordinary obsolescence, which occurs suddenly and cannot be anticipated. With respect to normal obsolescence, the regulations specifically provide that "In any case in which the taxpayer shows that the estimated useful life previously used should be shortened by reason of obsolescence greater than had been assumed in computing such estimated useful life, a change to a new and shorter estimated useful life computed in accordance with such showing will be permitted." When assets are retired because of extraordinary obsolescence, losses on such retirements may be taken.

On the subject of depreciation, the regulations provide that "the estimated useful life" (upon which



HISTORICAL RECORD — DATE FULLY DEPR. : : : : :

DATE	REF.	IDENTIFICATION	COST	RESERVE	UNREC. COST	REM. LIFE	ANNUAL DEPR.

MAINTENANCE AND REPAIRS

DATE	REF.	IDENTIFICATION	LABOR	MATERIAL	OVERHEAD	TOTAL

PERIODIC REVALUATIONS

DATE	REF.	CONDITION	COST OF REPRODUCTION	DEPR. %	COST OF REPRO. LESS DEPR.	FOR FIRE INSURANCE COVERAGE	
						EXCLUSIONS	TOTAL

the depreciation provision is based) may be subject to modification by reason of conditions known to exist at the end of the taxable year and shall be redetermined when necessary regardless of the method of computing depreciation," and again, "The reasonableness of any claim for depreciation shall be determined upon the basis of conditions known to exist at the end of the period for which the return is made."

Item vs. Multiple Accounts — These provisions which permit adjustments in the estimated remaining lives are sometimes overlooked by the taxpayer when he could use them to good advantage. The regulations permit the taxpayer to account for his depreciable property by items, or by classified, composite, or group accounts. A careful study of the regulations will indicate that there are certain definite advantages connected with the use of item accounts and item rates of depreciation, in that a loss is recognized upon the normal retirement of an asset from a single asset account; on the other hand, it is not allowed when an asset is retired from a multiple asset account where an average rate of depreciation has been applied. It is also true that adjustments in the estimated remaining lives of assets may be more readily made and supported under item accounts than under composite accounts where average life expectancies are used.

Although the use of single asset accounts has definite advantages from an accounting and income tax standpoint, in that it provides better control of large units of property such as a building or a machine, there are limits beyond which item control is not practicable. Units of property of small value, such as desks and chairs or general classifications of property such as manufacturing piping or power feed wiring, may well be controlled by groups and depreciated through the use of average rates.

To obtain the greatest advantage and flexibility in property and depreciation accounting, a property ledger providing a modified system of item control is well worth the time and cost involved in its preparation and perpetuation. Such a ledger includes a complete inventory of the property currently in use in the business, dates of its acquisition, original costs, depreciation accrued to date, unrecovered costs, estimated remaining lives, and the annual depreciation provision for each item or group.

Dual Records Desirable—Many accountants, economists, and trade associations are of the opinion that 1) property and depreciation records maintained for income tax purpose are inadequate to meet the needs of management, 2) depreciation taken on an original cost basis results in a substantial overstatement of earnings and understatement of costs, and 3) management and stockholders need to know these facts. They recommend that a dual set of records be kept, the one reflecting depreciation on original costs and the other reflecting depreciation in terms of the current value of the dollar.

Some persons have recommended that for cost accounting purposes, depreciation should be based on current costs of reproduction and should be computed on a normal life basis for all assets in use in the business, including those assets which have been fully amortised or depreciated on the books. It is only in this manner that the current rate of consumption of fixed assets can be properly measured, and the true costs properly determined. Where the use of the accelerated methods of depreciation permitted for income tax purposes would result in a substantial distortion of period earnings, a straight-line or unit-of-production method might be used for corporate purposes.

Conclusion—Of the many road blocks to needed modernization, one is undoubtedly the antiquated and inadequate methods of computing depreciation which fail to reflect obsolescence and fail to provide sufficient replacement funds based on current costs. Although better property control and better property records cannot cure all the ills of the industry or create profits where none exist, they can in many instances aid management in anticipating its replacement needs and provide a clearer picture of the true costs and earnings of the business.

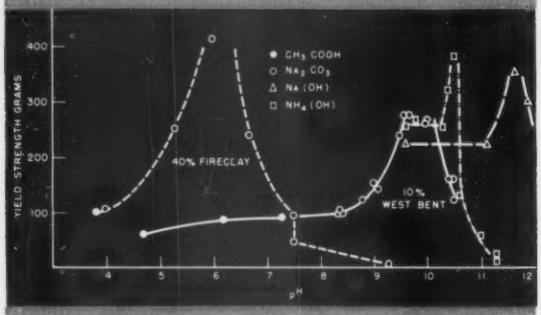


Fig. 1—Yield strength of fireclay and bentonite slurries increases then falls off as pH increases

EVALUATION OF BENTONITES

In the Steel Foundry

Various properties of western bentonite can influence molding sand mixes. Their influence and tests for measuring the characteristics of the material are described here. This article is from a paper given at several foundry conferences

By VICTOR E. ZANG
Vice President
Unitcast Corp., Toledo, Ohio

Fig. 2—Jolting test cup of device used to determine liquid limit of bentonite slurry

SEVERAL years ago, after solving a serious, recurring epidemic of scabs, mold tears, sand brittleness, etc., we set about to analyze the direct cause and solution of the problem.

Our solution to the problem was reported in published papers which included the chart of Fig. 1. It shows how a change in pH value of a 10 per cent bentonite slurry affected the yield strength. This change in pH was accomplished with various additives.

The change in yield reflected a change in the colloidal solution of the bentonite. As the pH dropped, the yield was lowered because the bentonite was being flocculated or curdled. This reaction also occurs and affects the bentonite in a sand-bentonite mixture when the pH changes.

Since western bentonite is a sodium-montmorillonite clay, the pH is inherently high, and conditions within the molding sand mixture that would lower the pH could adversely affect the quality of the mold and casting. We now think of the pH control in the sand mixture as controlling the compatibility of this mixture to the bentonite so as to get maximum results.

Have you tried washing your hands after squeezing lemons or using acid? The soap curdles and your hands get greasy. Neutralize the acid, and the soap reacts immediately, the water becoming a blue colloidal suspension of soap and dirt. This is similar to what happens to the bentonite.

It Does Happen—But, of course, "this can't happen to us." Well, it does. There are many things that may cause the condition—weather, souring of the sand, acid water, cereal flour, mold gases (CO_2), insufficient sodium or excess of calcium in the bentonite, etc. Yes, one of our problems was a bentonite with a 5.6 pH.

Many steel foundrymen, realizing that this was a possible solution to their problems, began controlling the pH and specifying it on their bentonite. Bentonite producers recognized that steel foundry bentonite had to be of high quality. They must more closely control their stripping operations, drying methods, and the sodium-calcium ratio.

But as we learned that slight additions of soda ash raised the pH and workability of the sand, we also realized the producer could improve the pH and apparent quality of his bentonite; and even at this writing we are unable to state whether such a treatment would be beneficial or detrimental to a steel foundry bentonite.

Other Factors?—Although many of us were checking the pH factor of bentonite shipments, some still encountered occasional troubles. Were there other factors or qualities of western bentonite that contributed to their successful use in the steel foundry?

Were these characteristics measurable? Were producers treating our bentonite?

At an earlier date, Jack Caine noticed these differences and introduced a settling test in which a small quantity of bentonite was dropped into a graduate of water; the slower the settling, the better the product.

This test was excellent because it indicated excess silt, colloidal activity, etc.; but it was also affected by the water condition and the manipulation and interpretation of the operator. There was no acceptable numerical index that could be derived from or applied to the test.

In 1955, the Steel Founders' Society of America, aware of the situation, entered into a project of developing qualifying tests and specifications through its Specifications and Technical Research committees.

Meetings were held with the producers; a research project was set up at Massachusetts Institute of Technology to investigate and develop rapid, reproducible qualifying tests that would be reasonable in cost and acceptable to the producer and foundryman.

A test known as liquid limit (W_L) was modified by Prof. Howard Taylor, and its introduction was described by William D. Emmett at the 1956 Steel Founders' Society's Technical and Operating Conference. At the same time, we (Unitcast) reported on a plastic viscosity test, used by some producers, which seemed to correlate quite well with molding characteristics. Both tests apparently indicated similar properties, but there was an equipment cost differential of about $350 in favor of the liquid limit test.

Variations encountered in test equipment were eliminated by standardizing the slurry mixer, the test cup, and the groover.

With a tentative specification also prepared, we at Unitcast were asked to run evaluation tests, since we had carried on considerable work on bentonite. To do this, we selected eight samples—from the many obtained from producers and foundries—which represented a gradual, decreasing liquid limit.

Since the specifications are written on several control factors deemed to guarantee a uniform product that would give the foundryman the green strength, moldability, dry strengths, etc. suitable for steel founding, a review and explanation of the salient points might be in order.

Moisture: Clay, as mined, contains 22 to 30 per cent moisture and must be dried for use. The specification sets 6 to 12 per cent as the acceptable moisture, which is generally acceptable to the producer.

A rapid method of drying a uniformly spread sample at 575° F for 15 minutes to determine the moisture content is given, as well as the standard laboratory method of drying a sample to a constant weight. There may be a difference in the moisture content as determined by the two methods; these errors prove insignificant, however, in the determination of the liquid limit.

pH Value—The minimum acceptable value is 8.2. This is determined electrometrically in a 6 to 8 per

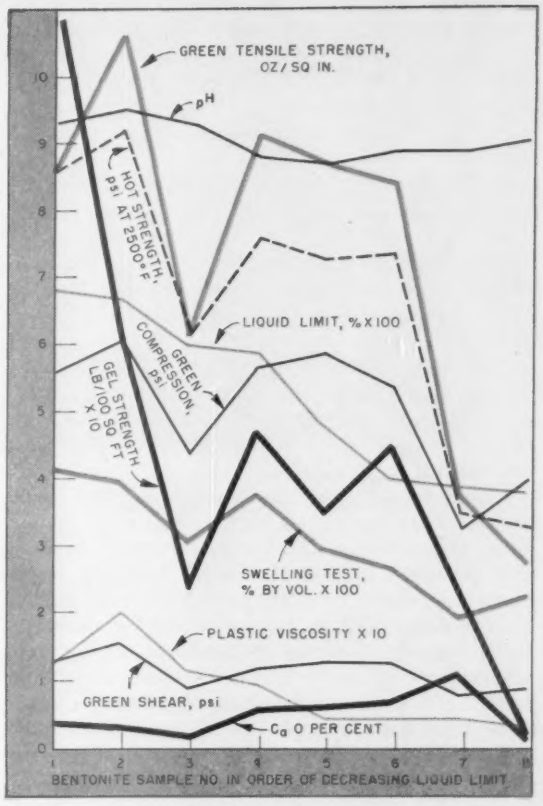
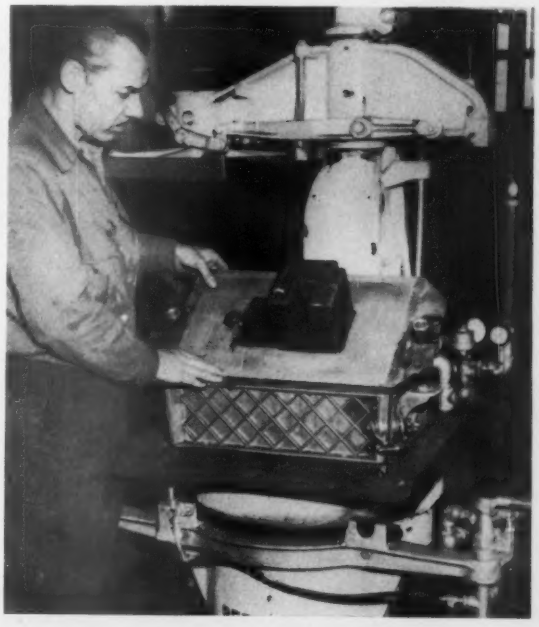

GREEN TENSILE STRENGTH, OZ/SQ IN.
pH
HOT STRENGTH, psi AT 2500° F
LIQUID LIMIT, % X 100
GREEN COMPRESSION, psi
GEL STRENGTH LB/100 SQ FT X 10
SWELLING TEST, % BY VOL. X 100
PLASTIC VISCOSITY X 10
GREEN SHEAR, psi
C_a O PER CENT
BENTONITE SAMPLE NO. IN ORDER OF DECREASING LIQUID LIMIT

Fig. 3—Showing variations in different physical and chemical properties of the eight samples of bentonite tested. Samples are plotted in the order of their decreasing liquid limit

Fig. 4—Special molding machine used to make molds for pouring test block castings from sand mixes containing the various bentonites



cent solution of bentonite. Producers use a 6 per cent solution. The water used should be neutral or 7.0 pH. If the solution became a thick slurry, migration of the ions might be impeded and erroneous results obtained.

Calcium Oxide: Since western bentonites are sodium-montmorillonites, the sodium ion predominates; however, calcium is generally present. A minimum sodium to calcium ratio of two to one should prevail. (Southern bentonites are predominately calcium-montmorillonites.) Determination of sodium is difficult, and it is believed a combination of maximum calcium oxide content and minimum pH will guarantee a reasonable sodium-calcium ratio.

Calcium oxide maximum is set at 0.70 per cent. A method of washing the soluble and exchange salts and ions from the bentonite and determining the calcium content by the standard Taylor water hardness method is explained.

Liquid Limit: The liquid limit, using the standardized SFSA method, is set at a minimum of 525. This, in essence, is the water content of a slurry that requires 25 blows on the test cup (Fig. 2) to close the groove for a distance of ½ inch. Liquid limit is determined by plotting a chart of the water content versus blows of at least two varying consistencies of a slurry of the bentonite on semi-logarithmic paper and reading the water content where the line intersects the 25 blow line.

For further discussion of this specification and equipment used, see March FOUNDRY, Page 127.

Now let us look at our eight samples of bentonite. Table I shows the values for the samples arranged in the order of decreasing liquid limit. All moisture contents are 6 per cent or more except No. 7; it is not a regular steel foundry bentonite. All pH values are well above the minimum. The CaO contents vary from 0.135 to 1.13 per cent. In samples 3 and 8 the sodium content could be two times—yes, six times—the calcium content and still be less than 1 per cent, which may undoubtedly account for their unsatisfactory results in sand mixtures. This indicates that we must watch our very low CaO contents as well as the high ones.

Liquid limit values show the high to be 685 and the low 387. Samples 1 to 4, inclusive, pass all the specifications, while 5 to 8, inclusive, fail to meet the W_L specification and, in some cases, exceed the maximum CaO content.

Today, some producers speak of "high gel" and "low gel" bentonites. Gel strength does not necessarily indicate the quality of bentonite for a steel foundry bond. Low gels are desirable for pumping in slurry systems and are used mostly in high-production iron shops.

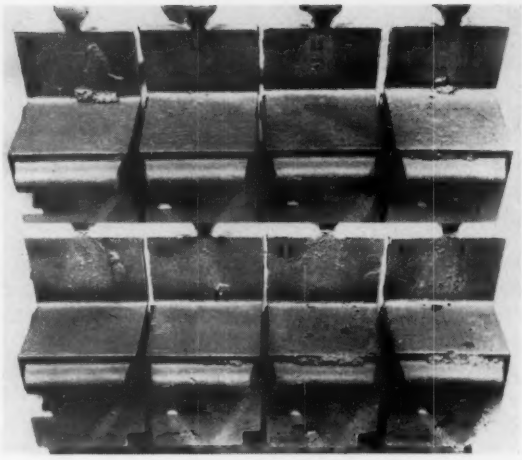


Fig. 5-6—Test castings from molds made of sand mixes containing 5% bentonite and 3% water

Let us look at plastic viscosity values. The relationship of these figures becomes more apparent when the results are plotted as in Fig. 3.

Note the resemblance of plastic viscosity, third line from the bottom, to the W_L line. Note the definite low values from sample 5 on, which also is the breaking point on the W_L.

The swelling test, shown as the fourth line up on the graph, is a simple test with which we have been experimenting, but in its present form it is not the most accurate or reproducible. Note, through, how closely it resembles the W_L.

To try to correlate these tests with the working of the clay in the foundry, let us look at the green tensile and the dry strengths.

Influence of Variables—All tests based on sand mixtures are affected by the sand variables: Grain size, grain distribution, and particle packing in the specimen. Therefore, such tests are only relative and apply only to the conditions at the time of the test. In your own foundry, with your sand, they are a guide to what you can expect.

In our work, the sand mix properties, given in Table I and shown by the top two lines of Fig. 3, are those generated by the mixture of 5 per cent bentonite and 3 per cent water in a 58-63 Ottawa round grain sand.

TABLE I—Qualifying Properties of Eight Bentonite Samples

Sample	% Moisture	Liquid Limit	pH	% CaO	Plastic Viscosity	Swelling Test	Gel Strength	Green Tensile	Green Compression	Green Shear	Hot Strength
1	6.7	685	9.4	0.40	13	42	110	8.6	5.6	1.3	8.6
2	7.5	675	9.5	0.31	21	40	60	10.8	6.1	1.6	9.2
3	7.3	605	9.35	0.15	12	31	24	6.2	4.4	0.9	6.2
4	9.6	595	8.8	0.57	10	38	47	9.2	5.7	1.2	7.6
5	6.2	458	8.7	0.62	5	30	35	8.8	5.9	1.3	7.3
6	6.0	405	8.9	0.69	5	27	45	8.5	5.4	1.3	7.4
7	4.7	395	9.0	1.13	5	20	23	3.8	3.3	0.8	3.5
8	6.3	387	9.2	0.135	4	23	2	2.8	4.0	0.9	3.3

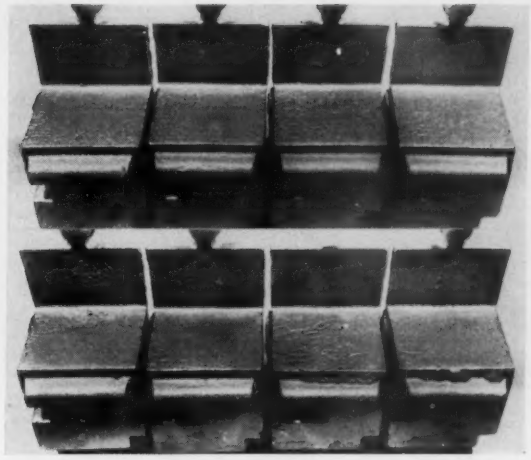


Fig. 7-8—In this series, sand brittleness becomes progressively worse starting with B-5

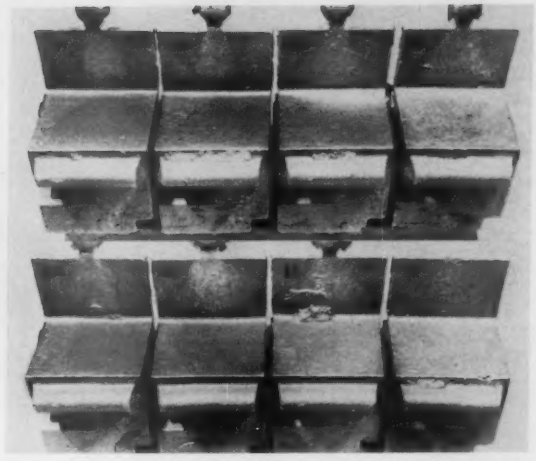


Fig. 9-10—Sand mix for these castings had a water content of 4% and 5% bentonite

We like our green tensile high, 9 or 10 ounces per square inch minimum; then we can regulate our sand mixes accordingly. Hot strengths mean mold durability, washing susceptibility, shakeout, etc. Since we have not encountered hot strengths of less than 7 psi at 2500° F, we cannot set limits, but the type of casting produced and the methods employed in the individual foundry will dictate the properties most desirable.

No. 3 sample, which seems to be a stranger in the field, is, in reality, a special granular low-gel bentonite used in the slurry method in some automotive iron foundries and should not be considered as a deterrent to the use of the specification. Remember, also, this sample contained only 0.15 per cent CaO and could be very low in Na content.

Although we use these tests to purchase and qualify our bentonite, we have not yet found the one single test that will adequately indicate the variation of qualities most essential to the steel foundryman, but they help keep the product more uniform.

Now let us take a look at the test block castings made in sand mixes containing the different bentonite samples.

All sand mixes were produced in 250-pound batches from Ottawa 58-63, washed and dried sand in an automatically controlled laboratory muller, with 5 per cent bentonite and 3 per cent water. Mixes were mulled dry one minute and wet five minutes. All eight mixes of a series were produced in the afternoon, stored in plastic bags overnight, and molded the next morning. A special molding machine, shown in Fig. 4, was used.

The flask was equipped with both cope and drag removable upsets to provide a constant volume of sand. Sand was struck off at upset height before jolting. Jolts for both drag and cope were held constant. After jolting, the upsets were removed and the sand struck off level with the flask for the squeeze. Squeeze was also held constant in pressure and holding time.

Fig. 5 and 6 show the first or A series of castings. Here, defects occurred that just could not be correlated, so the test was rerun. One will note, however, an increasing tendency to brittleness as we progress from A-4 to A-8, as shown by the mold tears. A-1 scabbed for some reason not explainable. Numbers on the castings correspond to the bentonite sample numbers of Table I.

In series B, Fig. 7 and 8, sand brittleness starts showing at B-5 and gets real serious at B-7 and 8. There is also a tendency to stick to the pattern.

With the small inlet gate, metal flow patterns are hard to overcome, but an increasing tendency to cut and scab can be seen from B-4 on. B-3's metal flow pattern resembled a slight swell. Remember, we had a low green and dry strength on this sample.

Another series, C, Fig. 9 and 10, was produced with 4 per cent water.

All sands were quite sticky to the feel and tended to stick to the pattern. Soft ramming prevailed; however, scabbing effect was not too serious until C-7. Small additions of cereal to the mixes would undoubtedly improve their workability and the casting results.

Testing Continued—Under present conditions, we will purchase and qualify our bentonites under the SFSA specifications; but we will continue to run our green and dry strength tests to avoid a situation as in sample 3. All tests can and must be run before we unload a car of bentonite.

Using these specifications and tests, we find the producers very willing to co-operate, and we have a more uniform bentonite, shipment after shipment, from which to calculate our sand mixes. I advocate that you do the same, or you may be the recipient of some bentonite that was refused by others.

This seemingly simple report entailed a lot of time and effort on the part of our chief chemist Ray Henry, and my assistant, Frank Madden, to whom I wish to express thanks for their help. I also extend thanks to the various producers and to the Ford Motor Co. for furnishing bentonite samples.

• An extra copy of this article is available until supply has been exhausted. Check Reader's Service Card, Page 51.

Foundry Modernization

Part II

Operations in the small and medium size castings foundries of General Electric Co. at Elmira, N. Y., are described in this second of three articles. These shops make gray iron castings weighing up to 400 lb

By ROBERT H. HERRMANN
Associate Editor

CASTINGS produced in the medium casting foundry of General Electric Co., Elmira, N. Y., are in the 30 to 400-lb range. Molds are made on five groups of cope and drag machines and set off on a mold car conveyor. Mold halves in the first group are produced on two jolt pin-lift machines which operate in conjunction with a green sand core booking machine. The machine places the core in the drag, and the cope is set on top with the aid of an electric hoist.

Each of the next three groups of molding units incorporates a jolt rollover draw machine for drags and a jolt-squeeze pin-lift for copes. A bridge crane hoist closes molds on a floor-level roller conveyor and sets the completed molds on the car conveyor.

In the last molding group a jolt-squeeze pin-lift machine for drags and a jolt-squeeze pin-lift machine for copes operate in conjunction with a jolt machine and jolt pin-lift for green sand cores, and a rock-over draw machine for booking the green sand core into the mold.

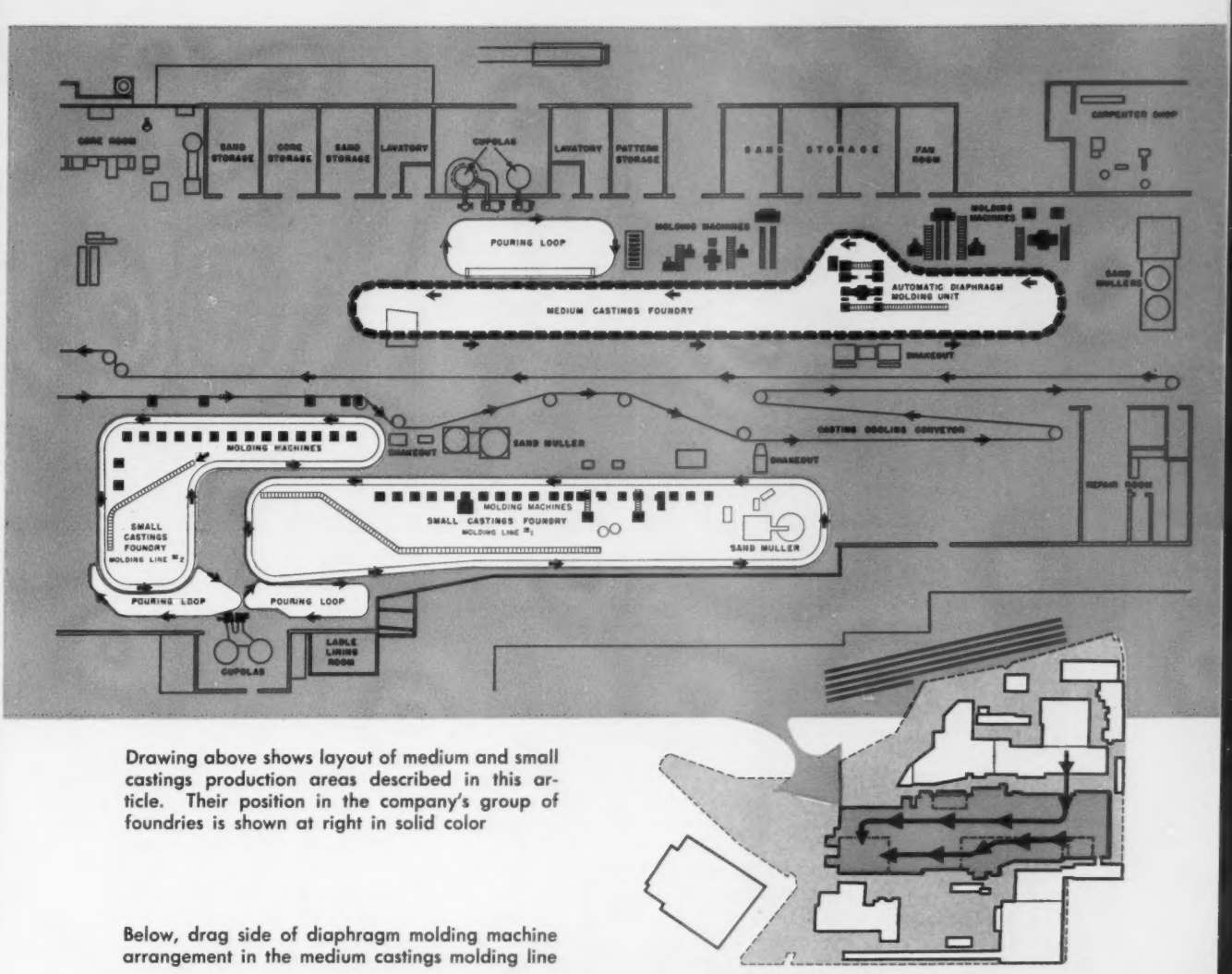
From the molding area the car conveyor passes through the pouring station and around to the shakeout where two operators with an air hoist suspended from a bridge crane remove the molds to a hooded, vibrating shakeout. The empty flasks are returned to the car conveyor and castings are segregated into tote boxes for trucking to the cleaning room. Sand falls through the shakeout to an oscillating conveyor for movement to a bucket elevator which feeds a used sand storage bin.

Molding sand is prepared in two 3000-lb mullers. Formulations and properties are similar to those of the sand used in the large casting foundry described in FOUNDRY for March on Page 70. Prepared sand is delivered by bucket elevator and overhead distribution belts to hoppers located over molding machines.

Automatic Diaphragm Molding Unit—Newest installation in the medium casting foundry is a fully automatic setup for making molds, blowing cores, setting the cores and closing the molds. The production unit is installed in the middle of the car conveyor loop and is designed to handle 36-in.-sq flasks of two depths. Drag flasks for motor end shields are 7¾ in. deep and for motor frames are 15 in. deep. All cope flasks are 15 in. deep. The system is designed to produce 60 completed molds an hour for uncored end shields and 40 completed molds an hour for green-sand-cored frames.

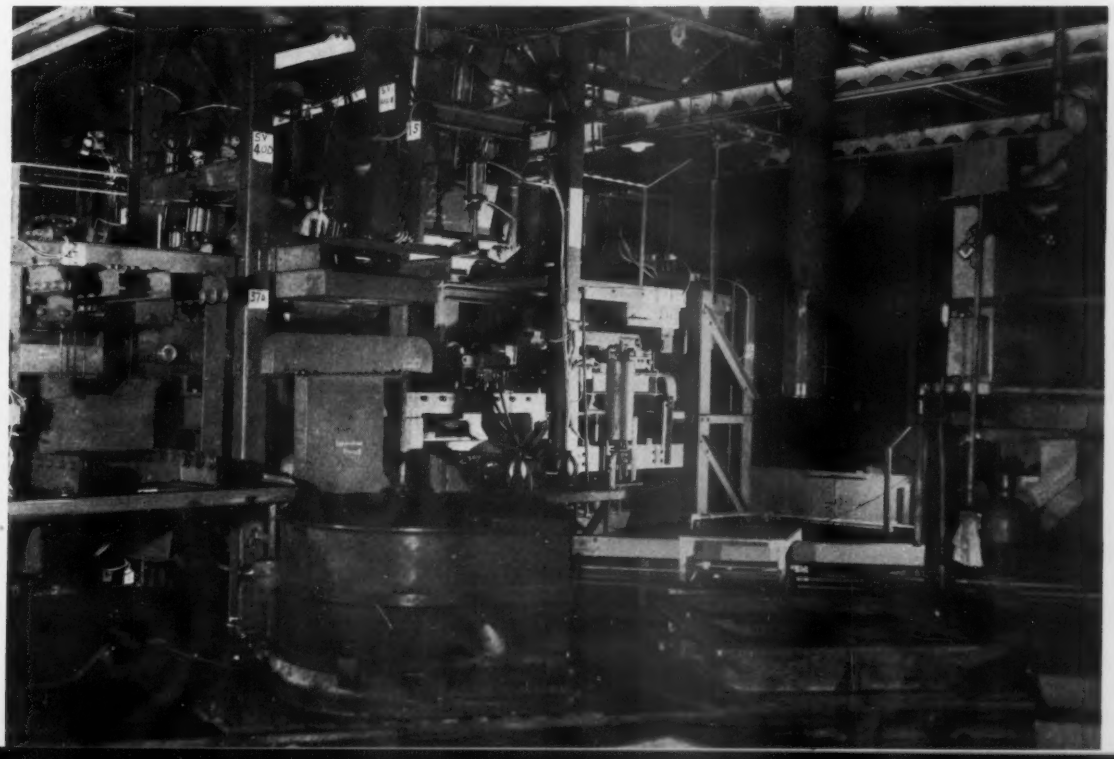
Cope and drag flasks are placed alternately on a powered wheel conveyor which feeds both the automatic cope flask loader and the drag flask loader. Cope flasks have small protuberances on the sides which trip limit switches to stop them on the cope loader. Drag flasks do not trip the switches, and, consequently, pass through to the drag loading station.

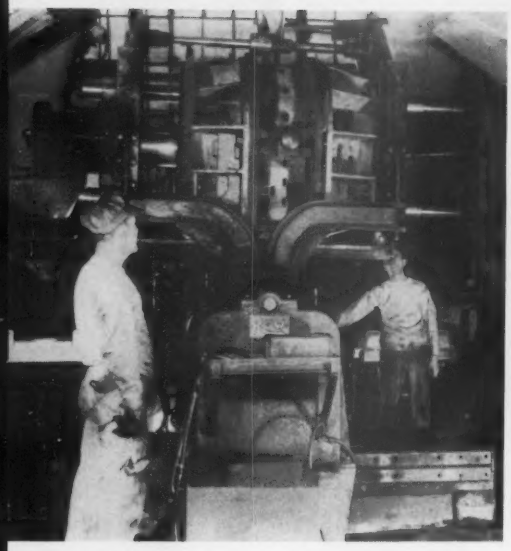
Air cylinders move empty flasks to two shuttle cars where an automatic device fills them with sand.



Drawing above shows layout of medium and small castings production areas described in this article. Their position in the company's group of foundries is shown at right in solid color

Below, drag side of diaphragm molding machine arrangement in the medium castings molding line





Green sand coremaking and booking machine in medium castings foundry books core into drag

View of molding stations along the mold-carrying monorail conveyor on one of the two loops which comprise the small castings foundry. Castings made here weigh up to 100 lb

The cars are stroked alternately into and out of a rubber diaphragm molding machine. Then the drag is moved into an automatic rollover unit, and green sand cores, blown on a machine next to the rollover, are set automatically. The cored drag then rolls over to a closing machine which previously has received the cope. The completed mold is ejected to a roller conveyor extension from which it is picked up by jib crane and set on the car conveyor.

Small Castings Production—The high-production, small castings foundry produces castings weighing from less than 1 lb to 100 lb. Two molding loops served by mold carriers suspended from an overhead monorail conveyor comprise this foundry. Eight jolt-squeezers, nine jolt-squeeze pin-lift semiautomatic machines, one jolt rollover draw machine, and two green sand coreblowers each serviced by a rollover machine are located inside Loop One. Each of the green sand core machines is operated in combination with two of the semiautomatic jolt-squeeze pin-lift molding machines. These production units are operated by two men. As one pushes the corebox into the blower the second man starts the molding cycle on the drag machine. He then rolls the blown corebox out of the blow machine, places the completed drag over it and rolls the assembly into the rollover draw machine.

In the meantime the operator of the cope machine has started a cycle. When the corebox is drawn off the drag he rolls the drag-core assembly out on a conveyor extension and sets the assembly on the mold conveyor. The cope man closes the cope over the core assembly on the mold conveyor and starts another cycle.

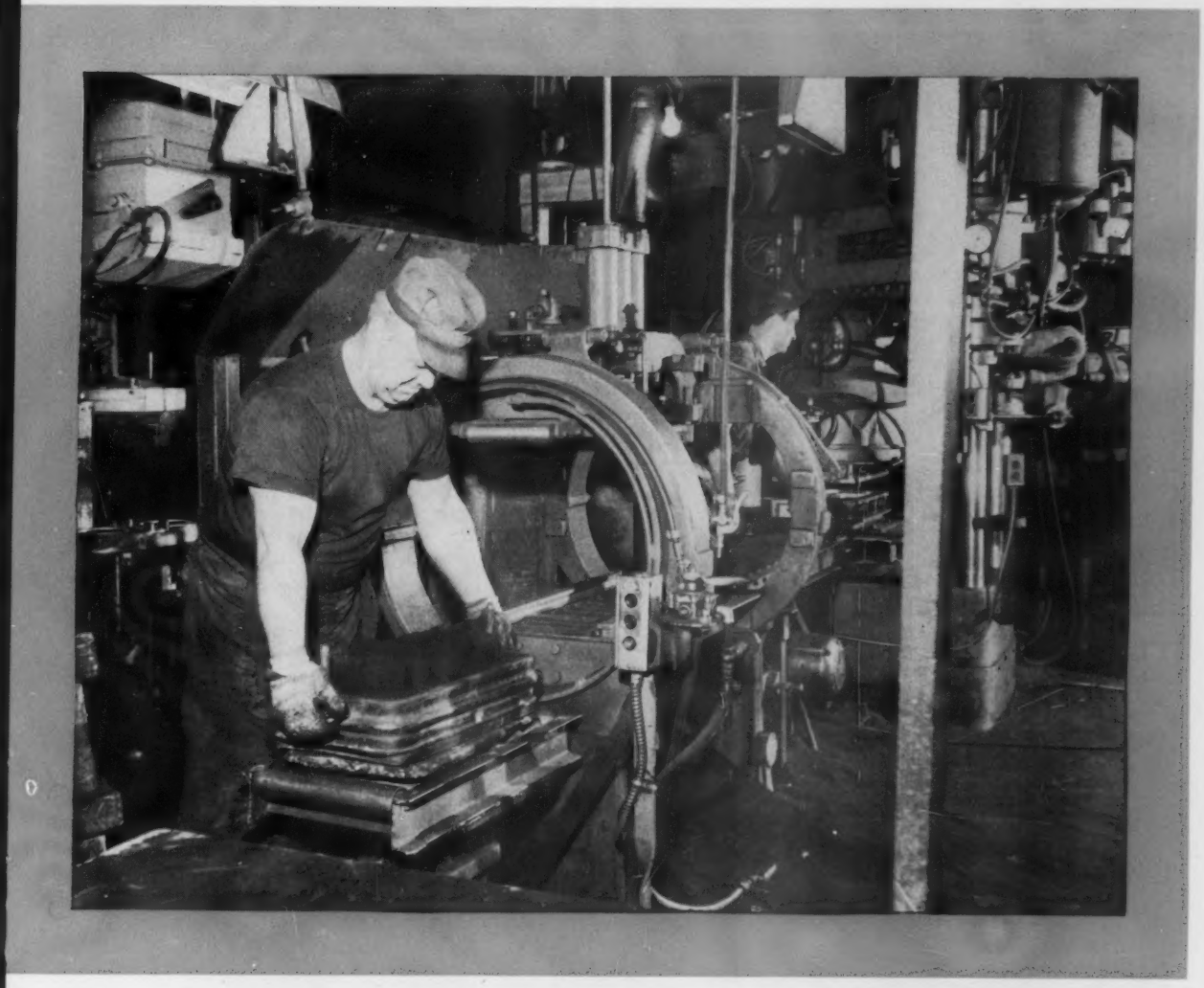
Just beyond the molding area, operators set weights on the molds by hand. Molds are poured from 100-lb ladles which are hand pushed along an overhead monorail loop. Pouring ladles receive molten iron directly from the cupola forehearth.

The mold conveyor proceeds through a cooling tunnel and weights are removed from the molds by hand and placed on an inclined belt conveyor which deposits them on a gravity roller conveyor leading to the weight-setting area. All molds except those containing certain delicate or fragile castings are hand dumped to a hooded, vibrating shakeout. Castings are hooked from the shakeout to three-sided pans mounted on a ceiling level monorail conveyor which dips to floor level at the shakeout. Electric resistor grid castings, which are made in snap flasks, are removed from the molds by hand; and gating metal also is broken off by hand. These hand operations are necessary because the resistor grids are quite fragile.

Second Loop Operations Are Similar—The second molding loop of the small casting foundry has 13 jolt-squeezers, three jolt-squeeze pin-lifts, one rock-over, and one jolt rollover molding machine. Mold handling, pouring, and shakeout operations are similar to those on Loop One.

Each loop has its own sand system. On Loop One, however, used sand from an overhead storage bin is carried by a belt conveyor to a weigh hopper over the muller. Additives are weighed. A standard molding sand mix consists of 1 lb western bentonite, 1 lb southern bentonite, and 3 lb wood-flour-carbon compound to each 1000-lb batch of sand. Moisture is held around 3.2 per cent.

Green sand core mixes also are prepared in this muller and contain 6 lb each of western bentonite, southern bentonite and corn-starch. Moisture is about 3.4 per cent. Prepared sands are discharged



Two green sand coreblowers, each serviced by a rollover machine, are located in Loop One of the small castings foundry. One is shown above

Molds on both small castings lines are poured from 100-lb capacity ladles hand-pushed along overhead monorail loops serving each line

from the muller to a bucket elevator which feeds an overhead distribution belt. A man on a catwalk along the belt operates plows to fill the various machine hoppers.

Sand mixes on Loop Two are similar to those used on Loop One, and sand handling is similar with the exception that used sand from the storage hopper is fed to the muller by a plate feeder.

Two Additional Cupolas Supply Iron—Metal for the two loops is supplied by two continuous-tap, front-slagging cupolas. One is run on the day shift; the other operates at night. Standard 20,000 and 30,000 psi irons are produced on a coke ratio of about 10 to 1. Temperature of the metal at the spout is 2750° F.

Cupola raw materials are unloaded by a bridge crane which fills charge make-up hoppers. Charges are made up in drop-bottom buckets carried on a scale car and charged into the cupolas by an over-

Men hook small castings from shakeout to three-sided pans on an overhead monorail conveyor

head monorail, electrically-propelled charger.

The coreroom for the small casting foundry is equipped with three blowers and four benches. Green cores are stacked on racks and moved by electric platform truck to any of seven gas-fired ovens.

Sand used in the coreroom is stored in a bin at floor level and moved from the bottom of the bin on an inclined belt to a weigh hopper, and from the bottom of the hopper by a second inclined belt to the 1000-lb capacity muller.

Prepared mixes are discharged from the muller to a tilting bucket attached to an electrically-driven monorail hoist for distribution to bench and machine hoppers. A core finishing and assembly area is located between the coreroom and the molding line.

Casting Cleaning Operations—The ceiling level conveyor carrying castings from the small casting foundry passes over a mezzanine where castings of a certain size are sorted into tote boxes for trans-

Small parts are desprued and cleaned in barrels or by blast equipment, then are transported to the grinding and inspection area shown below

fer by bridge crane to tumbling barrels, airless blast barrels, or to blast cleaning tables. Castings and gating metal remaining on the conveyor pan are tipped off into a chute leading to a rotating despruing barrel.

From the barrel they are discharged to a belt conveyor along which operators stand and sort the castings into tote boxes. This conveyor carries gating metal outside the foundry and discharges it in the metal storage yard. Electric platform trucks move the boxes of castings to tumbling barrels and blast cleaning equipment. Some castings, however, go directly from the desprue mill to a furnace for annealing at 1600° F for 3 hr.

Cleaned castings are reloaded into boxes and carried by bridge crane to the grinding area and dumped into a series of bins. Bins have sloping bottoms so that castings slide out through small openings near the bottom onto a shelf. They are ground on five double-end stand grinders situated in front of the bins and tossed onto a series of tables from which inspectors segregate good castings onto a conveyor belt running across the ends of the tables. Defective castings go onto a similar belt directly above the first one. Operators on the other side of the belt distribute the good castings into shipping containers and record the quantities.

Defective castings on the second belt are dumped onto a table where the nature and amount of scrap for each type of casting are recorded.

Castings from the large casting and medium casting foundries are brought into the cleaning room in tote boxes on electric platform trucks. They are placed in a room where cores are removed by a high pressure water-sand jet. Larger castings are blasted with steel grit in a walk-in blasting room and later are set out on the floor for chipping and grinding with pneumatic chisels and high-cycle electric grinders. Smaller castings are hung on hooks suspended from a monorail conveyor for movement through an automatic shot blasting room. As the conveyor emerges from the room, castings are unloaded onto waist-high gravity roller conveyors and moved past a series of benches on which grinding and chipping operations are performed.

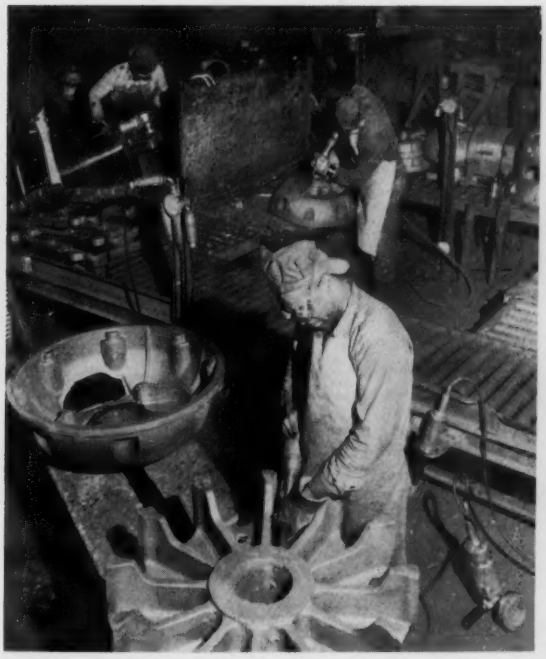
Cleaned castings continue on the roller conveyor to the inspection area. Castings to be painted are taken off the roller conveyor with a monorail hoist and hooked onto a monorail conveyor which travels into an electrostatic spray painting booth and in front of a water screen. The paint is an iron oxide prime coat used to prevent rusting of the castings during shipment and storage prior to machining. About 70 per cent of the castings produced at Elmira are painted. Castings are unloaded directly from the painting conveyor into shipping boxes.

Large castings which have been chipped and ground are inspected and then moved by bridge crane to a ventilated booth with another water screen, where castings are spray-painted prior to shipment.

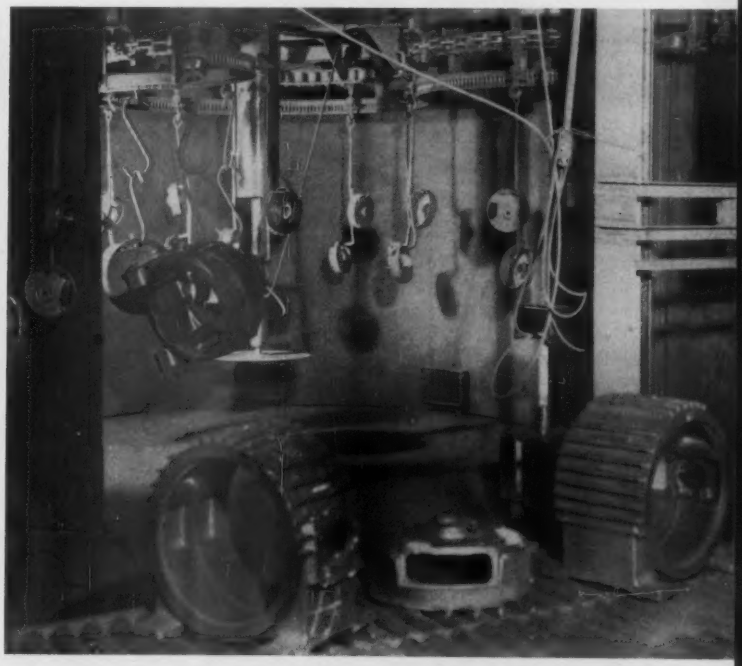
The third and concluding article in this series will describe GE's permanent mold foundry for producing gray iron castings.

• An extra copy of this article is available until supply has been exhausted. Check Reader's Service Card, Page 51.

Medium-sized castings which have been cleaned by shot blasting are pushed on gravity roller conveyors to benches for chipping and grinding



About 70 per cent of castings produced here are painted. The electrostatic spray painting booth below handles small and medium-sized castings



Cleveland Is Host to AFS CONGRESS

WALTER E. REMMERS

THE HOYT LECTURE

"Silicon—Present and Future" is the title of the 1958 Charles Edgar Hoyt Memorial Lecture to be presented at Cleveland on May 21 by Walter E. Remmers, vice president, Union Carbide Corp., New York.

Mr. Remmers, a graduate of Missouri School of Mines and Metallurgy, was assistant professor in engineering at Washington University from 1924 to 1928. After a number of years as chief of metal manufacturing at Western Electric Co., Chicago, Mr. Remmers joined Union Carbide in 1936 as a sales engineer for Electro Metallurgical Co. Twelve years later he was made president of the company, and in 1952 he was elected a vice president of Union Carbide Corp.

and SHOW

FOUNDRY practices, equipment, and materials will receive the concentrated attention of thousands of foundrymen at Cleveland on May 19 through 23. For the tenth time that city will be host to the American Foundrymen's Society, sponsor of the 62nd Castings Congress and the biennial Foundry Show.

Center of the week's activities will be the Cleveland Public Auditorium. It will serve as registration headquarters and site of most technical sessions, in addition to housing the extensive displays of foundry equipment, supplies, and services. Evening and luncheon sessions, as well as the annual banquet, are scheduled for the Statler Hotel.

Technical Program—Approximately 100 papers are on the technical program, which includes six shop course sessions.

The Sand Division will sponsor its usual heavy schedule of meetings. Highlights will be one session devoted to the CO_2 process, another to a symposium on packing characteristics of foundry sands, and a third to the effect of heat on properties of molding sands.

Pattern sessions will include one on shell mold patterns and coreboxes, another on plastic patterns and coreboxes.

Part of the Light Metals Division program will be given over to discussion of diecasting and permanent mold subjects. Casting of reactive metals is another scheduled topic.

Comprehensive programs also have been arranged by the society's divisions concerned with gray iron, steel, malleable iron, brass and bronze, and education, plus discussions on plant and plant equipment, heat transfer, industrial engineering, foundry fundamentals, and safety, hygiene and air pollution.

Shop Courses—Malleable shop courses, scheduled for Monday evening and Tuesday afternoon, will cover melting and heat treating. A sand shop course Tuesday evening will have a panel of five members discuss good sand practice. Gray iron courses on Thursday evening and Friday afternoon will be concerned primarily with microstructure of metal. A panel will discuss "What Is Expected of a Casting" at the brass and bronze course Thursday afternoon.

Luncheons—Luncheon sessions are to be held each day of the convention. The Management Development Committee will have two speakers for its Wednesday noon meeting at the Statler. Robert B. Parker, assistant to the president, American Brake Shoe Co., will discuss "Creating a Climate for Management Development," and Ray Monsalvatge, director of field education, National Management Association, will talk on "What the Trainee Needs to Know to Develop into Top Management."

The schedule for other luncheon meetings includes Steel Division on Monday, Malleable Division and Pattern Division on Tuesday, Light Metals Division on Thursday, Gray Iron Division and Brass and Bronze Division on Friday.

The Sand Division plans its annual dinner meeting for Tuesday evening.

Business Meeting—Annual business meeting of the society is to be held Wednesday at 9:30 a.m. in the Public Auditorium ballroom. Its program will include an address by President Harry W. Dietert, the awarding of apprentice contest prizes, election of officers and directors, and the presentation of AFS Awards of Scientific Merit and Service Citations.

Nominees for election at the annual meeting include the following: President, Lewis H. Durdin, president, Dixie Bronze Co., Birmingham; vice president, Charles E. Nelson, technical director, Magnesium Div., Dow Chemical Co., Midland, Mich.

ANNUAL BANQUET

Dr. Ralph E. Lapp, director, Nuclear Science Service, Arlington, Va., will be the principal speaker at the AFS annual banquet to be held at the Statler Hotel, Cleveland, the evening of May 21. His subject will be "Men, Rockets, and Atoms."

Dr. Lapp received his doctorate in cosmic ray physics at the University of Chicago. For a number of years active in atomic research, he was division director of the Manhattan Project and later was assistant director of the Argonne National Laboratory until appointed scientific advisor to the War Department General Staff. Before leaving government service to act as a consultant he headed the Nuclear Physics Branch of the Office of Naval Research.

DR. RALPH E. LAPP

Directors for three years: David W. Boyd, assistant general manager, Engineering Castings Inc., Marshall, Mich.; T. W. Curry, director of research, Lynchburg Foundry Co., Lynchburg, Va.; R. R. Deas Jr., vice president and works manager, Hamilton Foundry & Machine Co., Hamilton, Ohio; Jake Lee, president, Dee Brass Foundry, Houston; Webb L. Kammerer, president, Midvale Mining & Mfg. Co., St. Louis; H. M. Patton, manager, Foundry Div., American Hoist & Derrick Co., St. Paul.

The Charles Edgar Hoyt Memorial Lecture will follow the business meeting. It will be given by Walter E. Remmers, vice president, Union Carbide Corp., New York on the subject "Silicon—Present and Future."

Annual Banquet—AFS gold medal awards will be presented at the annual banquet to be held Wednesday evening at the Statler Hotel. For names of recipients of this year's gold medals and other awards, see Pages 174-176.

Principal speaker at the banquet will be Dr. Ralph E. Lapp, director, Nuclear Science Service, Arlington, Va., whose subject will be "Men, Rockets, and Atoms."

The Canadian dinner, another annual convention event, will be held Tuesday evening in the Carter Hotel ballroom, and the annual Alumni dinner for present and past officers, directors, and honorary life members is scheduled for Thursday evening.

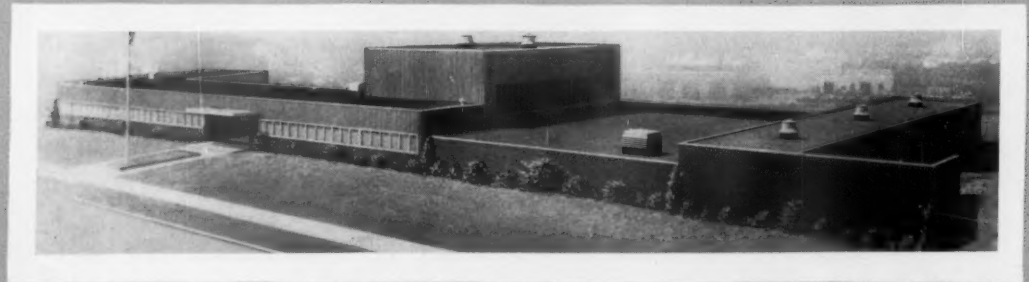
Ladies Entertainment—Hotel Cleveland will be registration headquarters for ladies attending the Congress. A committee appointed by Northeastern Ohio Chapter and under the chairmanship of Mrs. E. Claude Jeter has arranged a number of events for the visitors.

Monday a tea will be held at Hotel Cleveland from 2 to 4:30 p.m. Tuesday morning buses will leave Hotel Cleveland at 10 o'clock for an 11:30 luncheon at Tudor Arms Hotel, followed by a visit to General Electric Co.'s Nela Park for a lighting demonstration. A luncheon Thursday noon at the Higbee Co. lounge will include a style show.

Plant Visitations—Several of the Cleveland area's principal foundries will be open for inspection during the week. The local chapter's Plant Visitation Committee has arranged for visits at the plants and on the dates and hours listed below. Additional information concerning plant visits may be obtained from the committee at a desk it will maintain in Public Auditorium.

PLANT VISITATION SCHEDULE

COMPANY	TYPE OF WORK	DATES OPEN
ALUMINUM CO. OF AMERICA 2210 Harvard Ave.	Aluminum casting jobbing shop. Research and development laboratories. Proof of United States citizenship required	May 22 9 to 11 a.m.
CLEVELAND STANDARD PATTERN WORKS 5337 St. Clair Ave.	Modern shop, producing wood, metal, Fiberglas and plastic patterns	May 19 to 23 8 a.m. to 4 p.m.
FORD CLEVELAND FOUNDRY Engle Rd. near Brookpark Rd.	Highly mechanized automotive shop	May 19 10 a.m. to noon 2 to 4 p.m.
FULTON FOUNDRY & MACHINE CO. East 75th St. and Morgan Ave.	Medium to heavy castings in Meehanite. Semimechanized. Machine and pattern shops	May 20 to 22 9 to 11 a.m.
MAX S. HAYES TRADE SCHOOL 4800 Detroit Ave.	New school dedicated Oct. 29 includes well-equipped pattern and foundry shops	May 19 to 23 8 a.m. to 4:30 p.m.
NATIONAL MALLEABLE & STEEL CASTINGS CO. 10600 Quincy Ave.	Mechanized malleable foundry, Technical and Development Center	May 20 9 to 11:30 a.m. 2 to 4:30 p.m.



Technical Center of National Malleable & Steel Castings Co., Cleveland

TECHNICAL PROGRAM

MONDAY, MAY 19

8:30 a.m—Registration opens.

8:30 a.m.—Exhibits open.

9:00 a.m.—Ladies' registration opens (to 4 p.m.).

9:30 a.m.—Malleable Session (Public Auditorium)

Observations on Pin Hole Defects in White Iron Castings—R. W. Heine, University of Wisconsin, Madison, Wis.

Steel Scrap Specifications for Duplexing Cupola White Iron—R. H. Greenlee, Auto Specialties Mfg. Co., St. Joseph, Mich.

Your Foundry and Preventive Maintenance—C. E. Fausel, Central Foundry Div., GMC, Danville, Ill.

9:30 a.m.—Pattern Session (Public Auditorium)

Construction of Shell Mold Pattern and Coreboxes—W. A. Wright, Woodruff & Edwards Inc., Elgin, Ill.

Gating and Risering Shell Mold Pattern Equipment—D. C. Kidney, Westinghouse Air Brake Co., Wilmerding, Pa.

9:30 a.m.—Steel Session (Public Auditorium)

Improving Electric Furnace Refractory Life by Special Shell Cooling Techniques—V. J. Howard, Oklahoma Steel Castings Co., Tulsa, Okla.

The Electric Arc in Melting Furnaces—W. E. Schwabe, National Carbon Co., Division of Union Carbide Corp., New York

Some Factors Affecting the Toughness of Mild Steel Castings—H. H. Fairfield and J. A. Ortiz, Los Angeles Steel Casting Co., Los Angeles.

12 noon—Steel Roundtable Luncheon (Statler Hotel)

A Metallurgical Report on Russia—W. R. Hibbard, General Electric Co., Schenectady, N. Y.

2:30 p.m.—Sand Session (Public Auditorium)

Investigation of the Hardening of Sodium-Silicate-Bonded Sand—C. E. Wulff, University of Wisconsin, Madison, Wis.

Sodium Silicate for the CO_2 Process—E. A. Lange and R. E. Morey, U. S. Naval Research Laboratory, Washington.

CO_2 Core Experience in a Malleable Foundry—G. Nestor, National Malleable & Steel Castings Co., Cleveland.

2:30 p.m.—Pattern Session (Public Auditorium)

Pattern Standards for Practical Foundry Usage—E. A. Geary, Trafford Foundry, Westinghouse Electric Corp., Trafford, Pa.

Forum: "Where Do We Start?—You Must Tell Us!"—D. T. Kindt, Kindt-Collins Co., Cleveland; R. L. Olson, Dike-O-Seal Inc., Chicago; H. A. Burton, Canadian Steel Foundries, Montreal, Que., Canada.

2:30 p.m.—Malleable Session (Public Auditorium)

Annealing of Malleable Iron: Effect of Repeated Annealing on Rate of Second Stage Graphitization—J. E. Rehder and J. E. Wilson, Canada Iron Foundries Ltd., Montreal, Que., Canada.

Salt Bath Heat Treatment vs. Quench and Temper: Standard and Pearlitic Malleable—P. W. Green, General Electric Co., Erie, Pa.

4 p.m.—Light Metals Session (Public Auditorium)

Problems Encountered in Casting Reactive Metals—W. A. Aschoff and D. H. Blair, Oregon Metallurgical Corp., Albany, Oreg.

A Casting Technology for Reactive Metals—F. W. Wood, S. L. Ausmus, and E. D. Calvert, U. S. Bureau of Mines, Albany, Oreg.

Foundry Characteristics of a Rammed Graphitic Mold Material for Casting Titanium—H. W. Antes, R. E. Edelman, and J. T. Norton, Ordnance Corps, Frankford Arsenal, Philadelphia.

A Method of Casting Radiator-Type Fuel Elements for a Nuclear Reactor—A. W. Hare and R. F. Dickerson, Battelle Memorial Institute, Columbus, Ohio.

4 p.m.—Fundamental Papers Sessions (Public Auditorium)

Ductile High-Strength Titanium Castings by Induction Melting—J. Zotos, P. J. Ahearn, and H. M. Green, Watertown Arsenal, Watertown, Mass.

Effect of Pressure During Solidification on Microporosity in Aluminum Alloys—S. Z. Uram, M. C. Flemings, and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass.

Fundamental Studies on Effects of Solution Treatment, Iron Content and Chilling of Sand Cast Aluminum-Copper Alloy—E. M. Passmore, M. C. Flemings, and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass.

5:30 p.m.—Exhibits close.

6 p.m.—International Reception
(Cleveland Hotel) (By invitation only)

8 p.m.—Malleable Shop Course (Statler Hotel)

Melting Variables and Controls—L. R. Jenkins, Wagner Malleable Iron Co., Decatur, Ill.

TUESDAY, MAY 20

9 a.m.—Exhibits open.

9 a.m.—Pattern Session (Public Auditorium)

A Little Knowledge of Plastics—R. LeMaster, Nelson Pattern Works, Milwaukee.

Construction Hints and Wear Characteristics of Plastic Patterns and Coreboxes—V. E. Zang, Unitcast Corp., Toledo, Ohio.

9 a.m.—Light Metals Session (Public Auditorium)

Effect of Impurities on Corrosion Resistance of Magnesium Casting Alloys AM262 and AM266—B. J. Nelson, Aluminum Co. of America, New Kensington, Pa.

Some Requirements for Successful Fluidity Testing—S. A. Prussin, Pacific Semiconductors Inc., Culver City, Calif., and G. R. Fitterer, University of Pittsburgh.

An Improved Design for Cast Tensile Bar Molds—M. Karnowsky, Sandia Corp., Albuquerque, N. M.

9 a.m.—Safety, Hygiene & Air Pollution Session (Public Auditorium)

Noise—Induced Hearing Loss—Dr. E. L. Walsh, International Harvester Co., Chicago.

Radiation Protection Problems in Industry—A. F. Cota, A. O. Smith Co., Milwaukee.

Dust Piping Modifications to Prevent Material Build-Up and Wear—R. C. Ortgies, American Air Filter Co., Louisville, Ky.

9 a.m.—Steel Session (Public Auditorium)

Effect of Vanadium on the Mechanical Properties of a 1% Chromium, 1% Molybdenum Cast Steel—R. S. Zeno and L. D. Tote, General Electric Co., Schenectady.

Factors Influencing the Resistance of Steel Castings to High Stress Abrasion—T. E. Norman, Climax Molybdenum Co., Denver.

Cast Age Hardening Austenitic Steel—E. A. Lange, N. C. Howells, A. Bukowski, Naval Research Laboratory, Washington.

12 noon—Malleable Roundtable Luncheon (Statler Hotel)

Diversification in the Malleable Industry—L. D. Ryan, Malleable Founders' Society, Cleveland.

12 noon—Pattern Roundtable Luncheon (Carter Hotel)

How Patternmakers Can Help To Sell Castings—G. K. Dreher, Steel Founders' Society of America, Cleveland.

2:30 p.m.—Fundamental Papers Session (Public Auditorium)

Solidification and Risering of Gray Iron Castings—C. M. Adams, M. C. Flemings, and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass.

Formation of Ferrite and Pearlite in Cast Iron and Formation of Undercooled Graphite in Cast Iron—G. Ohira and K. Ikawa, Tohoku University, Sendai, Japan.

Effect of Some Gases on the Work of Adhesion Between a Novolak and Quartz—D. W. G. White, Dept. of Mines & Technical Surveys, Ottawa, Ont., Canada, and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass.

Effect of Temperature and Atmosphere on Iron-Silica Interface Reaction—G. A. Colligan, R. A. Flinn, and L. H. VanVlack, University of Michigan, Ann Arbor, Mich.

Reduction of Silica in Large Shell Molds—L. H. VanVlack, R. G. Wells, and W. B. Pierce, University of Michigan, Ann Arbor, Mich.

2:30 p.m.—Light Metals Session (Public Auditorium)

New Aluminum-Magnesium-Zinc Casting Alloy—

H. C. Rutemiller, Aluminum Co. of America, Cleveland.

High-Strength Aluminum Alloy X357, Properties and Aging Practices—A. B. DeRoss, Kaiser Aluminum & Chemical Sales, Inc., Chicago.

Foundry Practice for Sand Casting Commercially Pure Aluminum—M. V. Davis and R. V. Scalco, Anderson Electric Corp., Birmingham, Ala.

Tensile Properties of Microshrinkage-Graded AZ63 Magnesium Alloy—J. D. Grimsley and I. J. Feinberg, U. S. Naval Ordnance Laboratory, White Oak, Silver Spring, Md.

2:30 p.m.—Sand Session (Public Auditorium)

A Literature Survey of Metal Penetration—A. E. Murton and S. L. Gertsman, Dept. of Mines & Technical Surveys, Ottawa, Ont., Canada.

Mold Surface Behavior—D. Roberts, Oil City Iron Works, Corsicana, Tex., and E. E. Woodliff, Foundry Sand Service Engineering Co., Detroit.

Sintered Alumina Molds for Investment Castings of Steels—B. Bovarnick, F. C. Quigley, Watertown Arsenal, Watertown, Mass.

2:30 p.m.—Steel Session (Public Auditorium)

Purchase Specifications for Steel Foundry Mold and Core Sand Binders—E. G. Vogel, Lebanon Steel Foundry, Lebanon, Pa.

Shell Molding for Steel Castings—R. G. Powell and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass.

4 p.m.—Malleable Shop Course (Statler Hotel)

Supplemental Heat Treatment of Pearlitic Malleable Iron. Lead Pot Hardening—F. J. Asselin, Chevrolet Motor Div., GMC, Bay City, Mich. Induction Hardening—A. Hoover, Oldsmobile Motor Div., GMC, Lansing, Mich. Flame Hardening—A. C. Harris, Cincinnati Milling Machine Co., Cincinnati.

Hardenability of Pearlitic Malleable Iron—Progress Report, Pearlitic Malleable Committee (6-E), R. W. Heine, University of Wisconsin.

5:30 p.m.—Exhibits close.

6 p.m.—Sand Division dinner (Hotel Statler)

What European Foundrymen Are Doing—C. A. Sanders, American Colloid Co., Skokie, Ill.

Motion picture—*The Buhrer, Automated Molding and Pouring Method.* Comments by A. H. Homberger, American Automation Corp., New York.

7 p.m.—Canadian Dinner (Hotel Cleveland)

8 p.m.—Sand Shop Course (Hotel Statler)

Better Finish and More Accurate Dimensions Through Good Sand Practice. presiding—V. M. Rowell, Harry W. Dietert Co., Detroit.

Panel members: Gray iron—C. J. Jelinek, Ford Motor Co., Cleveland. Steel—R. McCleery, National Malleable & Steel Castings Co., Sharon, Pa. Malleable—C. E. Morrison, Dayton Malleable Iron Co., Ironton, Ohio. Light metals—R. E. Daine, Aluminum Co. of America, Cleveland. Brass & bronze—G. F. Watson, American Brake Shoe Co., Mahwah, N. J.

WEDNESDAY, MAY 21

8:30 a.m.—Registration opens.

9:30 a.m.—AFS Annual Business Meeting.
President's annual address. Apprentice contest awards. Election of officers and directors.

10:30 a.m.—Charles Edgar Hoyt Memorial Lecture.
Silicon: Present and Future—W. E. Remmers, vice president, Union Carbide Corp., New York.

11 a.m.—Exhibits open.

12 noon—Management Development Luncheon and Session (Statler Hotel)

Creating a Climate for Management Development—R. B. Parker, American Brake Shoe Co., New York.

Getting the Most Out of Yourself—R. Monsalvatge, Dayton, Ohio.

2:30 p.m.—Education Session (Public Auditorium)

Education and Our Industry's Survival. Panel members: G. K. Dreher, Steel Founders' Society of America, Cleveland; C. F. Walton, Gray Iron Founders' Society, Cleveland; H. F. Scobie, Non-Ferrous Founders' Society, Evanston, Ill.; J. H. Lansing, Malleable Founders' Society, Cleveland; C. V. Nass, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago; E. J. Walsh, Foundry Educational Foundation.

Motion picture—*Education and Our Industry's Survival*—I. H. Dennen, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago.

2:30 p.m.—Light Metals Session (Public Auditorium)

Induction Melting in a Magnesium Foundry—J. G. House and M. E. Brooks, Dow Chemical Co., Bay City, Mich.

The Release of Hydrogen from Molten Aluminum—A. Pal, Annapurna Metal Works, Calcutta, India, and H. M. Davis, Pennsylvania State University, University Park, Pa.

Improvement of Castings by Press Forging—A. H. Murphy and W. Rostoker, Armour Research Foundation, Chicago, and L. L. Clark, Fansteel Metallurgical Corp., Muskogee, Okla.

2:30 p.m.—Gray Iron Session (Public Auditorium)

A Study of the Ferritization of Nodular Iron—E. J. Eckel, University of Illinois, Urbana, Ill.

Magnesium Content and Graphite Forms in Cast Iron—J. F. Ellis and C. K. Donoho, American Cast Iron Pipe Co., Birmingham, Ala.

Some Structural Considerations in Nolular Iron —V. Pulsifer, Armour Research Foundation, Chicago.

2:30 p.m.—Sand Session (Public Auditorium)
The Basic Concepts Committee—V. M. Rowell, Harry W. Dietert Co., Detroit.
Theoretical Concepts of the Packing of Small Particles—J. B. Caine, consultant, Cincinnati, and C. E. McQuiston, Advance Foundry Co., Dayton, Ohio.
Compaction Characteristics of Silica Sands—R. W. Heine, University of Wisconsin, Madison, and T. W. Seaton, American Silica Sand Co., Ottawa, Ill.
Packing Characteristics of Typical Foundry Sands —L. J. Pedicini, Congress Die Casting Div., Tann Corp., Detroit.
Sieve Ratios and Processing for Strong Molding Sands—J. T. Parisi, O. C. Nutter, and C. Michalowski, Pekay Machine & Engineering Co., Chicago.

4 p.m.—Plant and Plant Equipment Session (Public Auditorium)
Prevention by the Ounce—F. J. Dost and G. P. Ribar, Sterling Foundry Co., Wellington, Ohio.
Establishing an Effective Preventive Maintenance Program—W. Huelsen, Caterpillar Tractor Co., Peoria, Ill.

5:30 p.m.—Exhibits close.

7 p.m.—AFS Annual Banquet (Statler Hotel)
Presentation of AFS Gold Medal Awards.
Guest speaker—Dr. Ralph E. Lapp, director, Nuclear Science Service, Arlington, Va. Subject: *Men, Rockets, and Atoms.*

THURSDAY, MAY 22

8:30 a.m.—Registration opens.

9 a.m.—Exhibit opens.

9 a.m.—Brass and Bronze Session (Public Auditorium)

Chemical Treatment of Copper Alloys—R. W. Ruddle, Foundry Services, Inc., Columbus, Ohio.
Deoxidation Practice for Copper Shell-Molded Castings—R. C. Harris, Ordnance Corps, Frankford Arsenal, Philadelphia.

9 a.m.—Sand Session (Public Auditorium)
Investigations on the Effect of Heat on the Bonding Properties of Various Bentonites — Franz Hofmann, George Fischer Ltd., Schaffhausen, Switzerland.
The Problem of Hot Molding Sands—R. W. Heine, University of Wisconsin, E. H. King and J. S. Schumacher, Hill & Griffith Co., Cincinnati.
Gas Pressures in Green Sand Molds—C. T. Marek, Purdue University, Lafayette, Ind., C. B. Ward, USAF, Materials Laboratory, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio.

9 a.m.—Heat Transfer Session (Public Auditorium)
Relationship of Interface Temperature and Solidification—Victor Paschkis and J. W. Hlinka, Columbia University, N. Y.
Ladle Heating in the Foundry—R. B. Renda, Purdue University, Lafayette, Ind., and W. M. Zeunik, National Malleable & Steel Castings Co., Indianapolis.

9 a.m.—Gray Iron Session (Public Auditorium)
Gases in Cast Iron with Special Reference to Pickup of Hydrogen from Sand Molds—J. V. Dawson and L. W. L. Smith, British Cast Iron Research Association, Birmingham, England. Presented by—H. E. Henderson, Lynchburg Foundry Co., Lynchburg, Va.
Risering of Gray Iron Castings—J. F. Wallace and E. B. Evans, Case Institute of Technology, Cleveland. (AFS research progress report.)
Progress Report—Joint AFS—AWS Committee on Welding (5-N).
Testing Methods & Procedures—B. F. Shepherd, Ingersoll-Rand Co., Phillipsburg, N. J.
Welding Gray Iron—S. Low, Chapman Valve Mfg. Co., Indian Orchard, Mass.
Welding Ductile Iron—Walter Edens, Allis-Chalmers Mfg. Co., Milwaukee.
Welding Malleable Iron—S. T. Walter, Air Reduction Sales Co., New York.

12 noon—Light Metals and Diecasting Roundtable Luncheon (Statler Hotel)
Automatic Ladling of Light Metals—R. C. Haverberg, A C Spark Plug Div. GMC, Flint, Mich.; C. H. George, Western Electric Co., Baltimore, Md.; H. Eriksen, Chrysler Corp., Kokomo, Ind.

2:30 p.m.—Brass & Bronze Seminar (Public Auditorium)
Subject—*What is Expected of a Casting.*
Panel: Casting redesign—W. F. Straight, Bethlehem Steel Co., Quincy, Mass. Casting design —J. S. McVey, General Electric Co., Everett, Mass. Casting purchasing—J. W. Foster, Ingersoll-Rand Co., Phillipsburg, N. J.

2:30 p.m.—Industrial Engineering Session (Public Auditorium)
An Approach to Work Simplification—C. A. Hanson, Deere & Co., Moline, Ill.
Effort Rating—a Series of Effort Rating Films—J. Taylor, Morris & Elliott Inc., Columbus, Ohio.

2:30 p.m.—Sand Session (Public Auditorium)
Hot Deformation of Molding Sand—H. W. Dietert, Harry W. Dietert Co., Detroit and T. E. Barlow, Eastern Clay Products Dept., International Minerals & Chemicals Corp., Chicago.
Correlation of Green Strength, Dry Strength and Mold Hardness of Molding Sands—R. W. Heine, University of Wisconsin, Madison, E. H. King and J. S. Schumacher, Hill & Griffith Co., Cincinnati.

4 p.m.—Light Metals Session (Public Auditorium)
Performance of Chills on High Strength Magnesium Alloy Sand Castings of Various Section Thickness—M. C. Flemings, R. W. Strachan, E. J. Poirier, and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass.
Rigging Design of High Strength Magnesium Alloy Castings—M. C. Flemings, R. W. Strachan, E. J. Poirier, and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass.
The Effect of Cooling Rate on Grain Size of Magnesium Casting Alloys—R. D. Green, Dow Chemical Co., Midland, Mich.
The Parlanti Mold Process for the Casting of Metal by Controlled Rate of Heat Transfer—C. A. Parlanti and R. D. Veneklasen, Niforge

Engineered Castings, Inc., Boston.

5:30 p.m.—Exhibits close.

7 p.m.—AFS Alumni Dinner (Union Club)

8 p.m.—Gray Iron Shop Course (Statler Hotel)
Basic Microstructures—C. F. Walton, Gray Iron Founders' Society, Cleveland.

FRIDAY, MAY 23

8:30 a.m.—Registration opens.

9 a.m.—Exhibits open.

9 a.m.—Gray Iron Session (Public Auditorium)
The Controlled-Slag Hot-Blast Cupola—D. Fleming, foundry consultant to Textile Machinery Makers Ltd., England. (Officially sponsored by the Institute of British Foundrymen.) Presented by R. W. Kraft, University of Michigan, Ann Arbor, Mich.
Foundry Applications of the Calcium Carbide Injection Process—W. R. Lysobey and A. E. Tull, Air Reduction Sales Co., New York.
Effect of Size of Scrap on the Tapping Temperature of the Cupola—N. H. Keyser and W. L. Kann, Jr., Battelle Memorial Institute, Columbus, Ohio.

9 a.m.—Diecasting Session (Public Auditorium)
Die and Permanent Mold Casting of Non-Ferrous Metals in the United Kingdom—L. J. Brice and G. A. Broughton, Ministry of Supply, England.
Aluminum Melting Practice in the Die Casting and Permanent Mold Fields—J. P. Moehling, Stroman Furnace & Engineering Co., Franklin Park, Ill.

9 a.m.—Brass and Bronze Session (Public Auditorium)
Brass & Bronze Research Report — *Effects of Foundry Variables on Porosity of 85-5-5-5 Bronze*—R. A. Flinn and C. R. Mielke, University of Michigan, Ann Arbor, Mich.
Occurrence and Elimination of Leakage in a Gun Metal Casting—M. Glassenberg, Armour Research Foundation, Chicago, A. H. Hesse, R. Lavin & Sons Inc., Chicago, and W. H. Baer, Bureau of Ships, Navy Department, Washington.
Use of Oil-Bentone Sand for Higher Quality Finish in Brass and Bronze Castings—O. E. Johnson, H. B. Ives Co., New Haven, Conn.

9 a.m.—Heat Transfer Clinic (Public Auditorium)
Panel—Victor Paschkis, Heat & Mass Flow Analyzer Laboratory, Columbia University, New York; J. B. Caine, consultant, Cincinnati; W. E. Sicha, Aluminum Co. of America, Cleveland; C. K. Donoho, American Cast Iron Pipe Co., Birmingham; R. C. Shnay, Canada Iron Foundries Ltd., Toronto, Ont.

12 noon—Brass and Bronze Roundtable Luncheon (Statler Hotel)
New Developments in Copper-Base Alloy Casting Methods—N. Birch, American Brake Shoe Co., St. Louis, and Nathan Janco, Centrifugal Casting Machine Co., Tulsa, Okla.

12 noon—Gray and Ductile Iron Roundtable Luncheon (Statler Hotel)
Duplexing Pays at Pontiac Foundry—H. A. Laforet, Pontiac Motor Co., Pontiac, Mich., and F. J. Webbere, Research Staff, GMC, Detroit.

2:30 p.m.—Diecasting Session (Public Auditorium)
Melting Practice for Aluminum Casting Alloys—W. N. Brammer, Apex Smelting Co., Cleveland.
Progress in Vacuum Diecasting—D. Morgenstern, Nelmore Mfg. Corp., Euclid, Ohio.
Experiences in Non-Ferrous Die Casting Die and Permanent Mold Life—G. Otto, Maytag Co., Newton, Iowa.

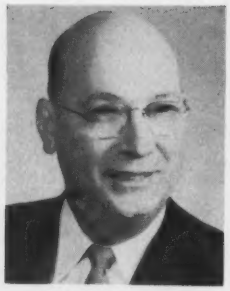
2:30 p.m.—Industrial Engineering Session (Public Auditorium)
Introduction to Work Sampling (motion picture) University of California, Berkeley, Calif.
Practical Application of the Work Sampling Technique—J. N. Capretta and R. M. Keenan, International Harvester Co., Chicago.

2:30 p.m.—Gray Iron Shop Course (Public Auditorium)
Relation of Mechanical Properties to Microstructures—S. C. Massari, American Foundrymen's Society, Des Plaines, Ill.

2:30 p.m.—Sand Session (Public Auditorium)
Industrial Application of Olivine Aggregate—G. S. Schaller, University of Washington, Seattle.
Evaluation of Shell Molding Capability—W. C. Truckenmiller, C. R. Baker, and G. H. Bascom, Albion Malleable Iron Co., Albion, Mich.
Report of Shell Molding Survey—N. Sheptak, Dow Chemical Co., Midland, Mich. (Report of Sand Division Committee 8-N.)
High-Temperature Properties of Shell Molds—R. A. Rabe, Foundry Process Development Section, GMC, Detroit. (Report of Sand Division Committee 8-N.)

5 p.m.—Exhibits close.

FRANK J. DOST



E. CLAUDE JETER

EMIL J. ROMANS

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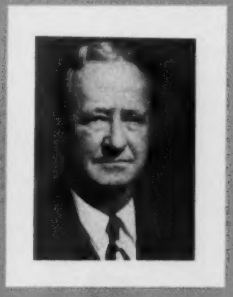

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Modern Castings

Nine Men Named for

AFS Annual

GOLD MEDALS

RALPH A. CLARK will be awarded the Thomas W. Pangborn Gold Medal of AFS "for outstanding contributions to the society and to the ferrous castings industry, especially in the field of gray iron metallurgy." Mr. Clark obtained his metallurgical training at the University of Detroit. He has held the post of metallurgist with Cadillac Motor Car Div., Detroit, Ryan Foundry, Ecorse, Mich., and Lakey Foundry Co., Muskegon, Mich. Mr. Clark joined Electro Metallurgical Co., division of Union Carbide Corp., in 1945, serving as service engineer in the Chicago and Detroit offices. He has been manager of foundry service with offices in Cleveland since 1956. Joining the AFS in 1931, Mr. Clark has been active in its Gray Iron Division and has spoken before numerous society meetings.

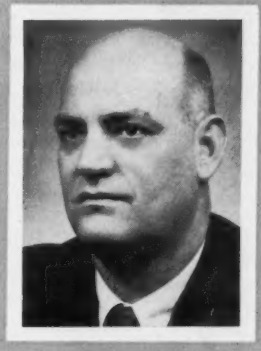
HOWARD J. ROWE will be awarded the William H. McFadden Gold Medal of AFS in recognition of his "outstanding contributions to the society and to the light metals branch of the castings industry." Mr. Rowe has been associated with the Aluminum Co. of America since 1927, beginning as a laboratory technical assistant at Cleveland following graduation from Case Institute of Technology. He advanced through various metallurgical and laboratory managerial posts until his appointment in 1940 as chief works metallurgist. Transferred to Pittsburgh in 1944 to become chief metallurgist of the company's castings division, he was advanced to chief metallurgist for the fabricating division in February, 1957. Mr. Rowe's articles and papers on aluminum foundry practice reflect his keen interest in the development and application of aluminum alloys, their technical control and inspection.

WILLIAM W. MALONEY will be awarded the Joseph S. Seaman Gold Medal of AFS "for enthusiastic leadership and completely unselfish devotion to the society as its secretary and general manager." Mr. Maloney was graduated from the University of Illinois in 1925. As a student he worked for the late Robert E. Kennedy, then foundry instructor at the university and later secretary and administrative head of AFS. Following graduation Mr. Maloney served for a short time as editorial staff writer for Penton Publishing Co. In 1929 he worked briefly for the AFS, then left to engage in advertising work, but returned in 1942 to assist with the AFS Foundry Shows and edit the monthly publication. In 1944 he became business manager in charge of exhibits, membership promotion, and book sales. On Mr. Kennedy's retirement in 1945 Mr. Maloney was elected secretary and general manager, and the following year he also became treasurer.

Awards

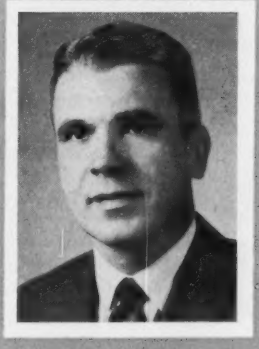
Nine men have been selected by the Board of Awards of the American Foundrymen's Society to be honored at the Cleveland convention. Three gold medals will be awarded at the annual banquet on May 21. Three Awards of Scientific Merit and three Service Citations will be made at the annual business meeting to be held that morning

SCIENTIFIC MERIT



MERVIN H. HORTON, supervisor of foundry service, Materials Engineering Division, Deere & Co., Moline, Ill., will receive an award of scientific merit "for technological contributions over many years to the Gray Iron and Sand Divisions of the Society." Mr. Horton became associated with the foundry industry in 1934 as a trainee with Deere & Co. During the 24 years he has been with the company, he has advanced through the positions of foundry metallurgist, general supervisor, and foundry superintendent. At the same time foundry practices in the Deere foundry have kept pace with developments in the industry. In addition to committee activity in the AFS Sand and Gray Iron Divisions, Mr. Horton has been chairman of the Quad City Chapter.

KENNETH H. PRIESTLEY, president, Vassar Electroloy Products Inc., Vassar, Mich., will receive an award of scientific merit "for long and conscientious effort in the development of Gray Iron Shop Course programs at the annual AFS Castings Congress." Mr. Priestley was graduated from Michigan State University in 1934 and immediately joined the Foundry Division of Eaton Mfg. Co., Vassar, becoming chief metallurgist the following year. In 1946 he resigned to establish Vassar Electroloy Products. In addition to his significant contributions as chairman of the Gray Iron Shop Course Committee, Mr. Priestley's extensive AFS activities have included being chairman Saginaw Valley Chapter in 1952; chairman, Michigan Regional Foundry Conference, 1954; industrial advisor, AFS Student Chapter, Michigan State University, 1954-1957, and member of the Executive and Advisory Committees of the Gray Iron Division.



FRANKLIN B. ROTE, technical director, Albion Malleable Iron Co., Albion, Mich., will receive an award of scientific merit "for noteworthy contributions to the AFS Malleable Division in furthering the technical prestige of the society." Dr. Rote was graduated from the University of Michigan in 1939 and received his Ph. D. there in 1944. He joined Albion Malleable in 1951. Previously he had been associated with International Nickel Co. at Bayonne, N. J., and Wyman-Gordon Co., Worcester, Mass. Following World War II he taught at the University of Michigan and did consulting work on foundry and metallurgical problems. He is immediate past chairman of the AFS Malleable Division.

SERVICE CITATION

FRANK S. BREWSTER, director of research and development, Brumley-Donaldson Co., Huntington Park, Calif., will receive a service citation "for valuable service to the society and the castings industry in the development and dissemination of basic sand technology." Mr. Brewster, graduated from Michigan State University in 1926, entered the foundry industry in 1929 as a chemist for Saginaw Malleable Iron Div., Saginaw, Mich. Subsequently he was associated with Baker-Perkins Inc., Saginaw; Dow Chemical Co., Bay City, Mich.; Harry W. Dietert Co., Detroit, and South Gate Magnesium & Alloy Co., South Gate, Calif. He joined Brumley-Donaldson Co. in 1955. Mr. Brewster is known nationally as an authority on sand technology. He was chairman of the AFS Sand Division in 1953-55.

ERNEST T. KINDT, president, Kindt-Collins Co., Cleveland, will receive a service citation "for faithful and continuous service to the society and the patternmaking branch of the castings industry." Mr. Kindt served a patternmaking apprenticeship at the National Tube Co., Lorain, Ohio, and then worked with a number of companies in the Cleveland area before organizing Kindt-Collins Co. in August, 1914. Mr. Kindt has been a popular speaker discussing patternmaking and current developments in the trade before numerous AFS chapters. He also has served many years on committees of the society's Pattern Division.

FREDERICK G. SEFING, metallurgist, International Nickel Co., New York, will receive a service citation "for long and conscientious service to AFS and the castings industry in fostering foundry educational programs at all levels." Mr. Sefing was graduated from Lehigh University in 1919 and received a master's degree from Pennsylvania State University in 1924. Prior to joining International Nickel Co. in 1937, Mr. Sefing had been employed in industry two years, was an instructor at Penn State three years, and in 1924 joined the teaching staff of Michigan State University. His years of service to the AFS included chairmanship of the Educational Division and the Committee on Co-Operation with Engineering Schools. He is one of the founding members and a past chairman of the Metropolitan Chapter.

LIFE MEMBERSHIP

HARRY W. DIETERT, chairman, Harry W. Dietert Co., Detroit, becomes an honorary life member of the society upon completion of his term as president. He was graduated from Iowa State College and joined U. S. Radiator Corp., Detroit, in 1923. He resigned in 1936 as chief engineer to devote full time to his own company, which he founded in 1925. Mr. Dietert has been a national AFS director, chairman of the Detroit Chapter, Charles Edgar Hoyt lecturer, and recipient of the McFadden Gold Medal.

AFS FOUNDRY SHOW

APPROXIMATELY 225 companies offering equipment, supplies, or services to the foundry industry will participate in the Foundry Show of the American Foundrymen's Society at Cleveland Public Auditorium, May 19-23.

Exhibits will be open during these hours: Monday, 8:30 a.m. to 5:30 p.m.; Tuesday, 9 a.m. to 5:30 p.m.; Wednesday, 11 a.m. to 5:30 p.m.; Thursday, 9 a.m. to 5:30 p.m.; Friday, 9 a.m. to 5 p.m.

Numerous new or improved products are to be shown, and the number of operating exhibits—either actual units or working models—is expected to be larger than ever before.

An innovation this year will be the availability of two theatres where product application films of exhibitors will be shown. Some 56 hours of projection have been scheduled.

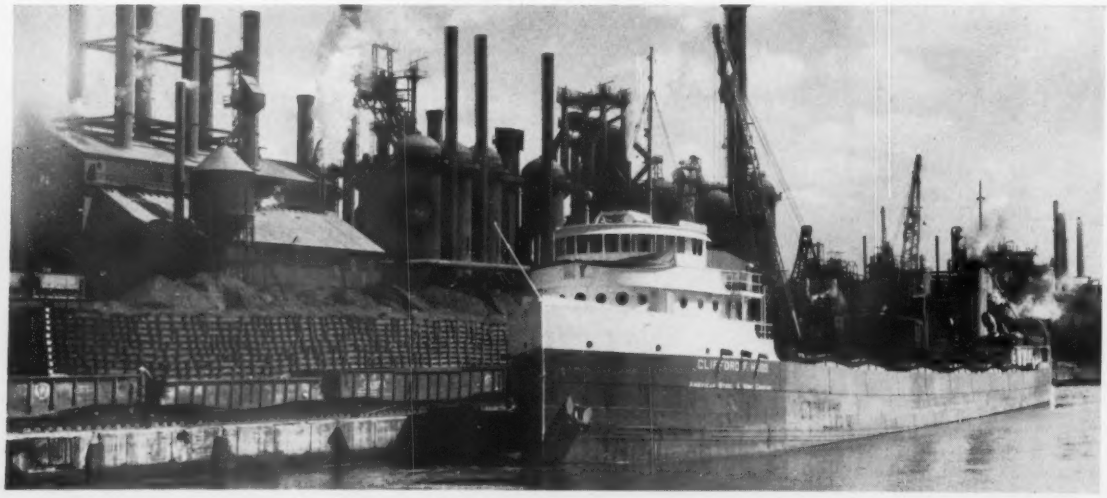
Registration fees for the Congress and Show are $2 for AFS members, $5 for nonmembers. On Friday—Northeastern Ohio Day—shop men of the area will be admitted by free tickets distributed by the Northeastern Ohio Chapter.

List of Exhibitors

(As of April 21)

Acme Resin Corp. . . . . Forest Park, Ill.
Adams Co. . . . . Dubuque, Iowa
A. I. C. Engineering Co. . . . . Indianapolis
Air Reduction Sales Co. . . . . New York
Ajax Electrothermic Corp. . . . . Trenton, N. J.
Ajax Engineering Corp. . . . . Trenton, N. J.
Ajem Laboratories Inc. . . . . Livonia, Mich.
Alloy Metal Abrasive Co. . . . . Ann Arbor, Mich.
Alloy Metal Products Inc. . . . . Davenport, Iowa
Alphaco Inc. . . . . York, Pa.
Alpha-Lux Co. . . . . New York
Aluminum Co. of America . . . . . Pittsburgh
American Air Filter Co. . . . . Louisville
American Alloys Corp. . . . . Kansas City, Mo.
American Automation Corp. . . . . Ann Arbor, Mich.
American Chain & Cable Co. . . . . Bridgeport, Conn.
American Colloid Co. . . . . Chicago
American Fire Clay & Products Co. . . . . Canfield, Ohio
American Foundry Flask Co. . . . . Kansas City, Mo.
American Gas Association . . . . . New York
American Marietta Co. . . . . Wheeling, Ill.
American Metal Market Co. . . . . New York
American Refractories & Crucible Corp. . . . . North Haven, Conn.
American Society for Metals . . . . . Cleveland
Apex Smelting Co. . . . . Chicago
Applied Research Laboratories . . . . . Glendale, Calif.
Arcair Co. . . . . Lancaster, Ohio
Archer-Daniels-Midland Co., Federal Foundry Supply Div. . . . . Cleveland
Automation . . . . . Cleveland
Baroid Div., National Lead Co. . . . . Chicago
C. O. Bartlett & Snow Co. . . . . Cleveland
Beardsley & Piper Div., Pettibone Mulliken Corp. . . . . Chicago
Beryllium Corp. . . . . Reading, Pa.
Blastcrete Service Co. . . . . Los Angeles
Blaw-Knox Equipment Div., Blaw-Knox Co. . . . . Pittsburgh
Bradley Washfountain Co. . . . . Milwaukee
British Industries Corp. . . . . Port Washington, N. Y.
British Moulding Machine Co. Ltd. . . Faversham, England
Brown Co. . . . . Boston
Brown Fintube Co. . . . . Elyria, Ohio
Brush Beryllium Co. . . . . Cleveland
Burr Aluminum Products . . . . . Burr Oak, Mich.
C & S Products Co. . . . . Detroit
Campbell-Hausfeld Co. . . . . Harrison, Ohio
Carborundum Co., Electro Minerals Div. . . . . Niagara Falls, N. Y.

Carl Mayer Corp. ..... Cleveland
Carrier Conveyor Corp. ..... Louisville
Carver Foundry Products Co. ..... Muscatine, Iowa
Centrifugal Casting Machine Co. ..... Tulsa, Okla.
Centri-Spray Co. ..... Livonia, Mich.
Clearfield Machine Co. ..... Clearfield, Pa.
Cleveland Flux Co. ..... Cleveland
Cleveland Metal Abrasive Co. ..... Cleveland
Cleveland Vibrator Co. ..... Cleveland
Continental Silica Co. ..... Somonauk, Ill.
Corn Products Sales Co. ..... New York
Davey Compressor Co. ..... Kent, Ohio
Davis Fire Brick Co. ..... Columbus, Ohio
Dayton Oil Co. ..... Dayton, Ohio
Delhi Foundry Sand Co. ..... Cincinnati
Delta Oil Products Corp. ..... Milwaukee
Demmler Mfg. Co. ..... Kewanee, Ill.
Dependable Pattern Works ..... Portland, Oreg.
Detroit Electric Furnace Div., Kuhlman Electric Co. ..... Bay City, Mich.
Devcon Corp ..... Danvers, Mass.
Diamond Alkali Co. ..... Cleveland
Harry W. Dietert Co. ..... Detroit
Dike-O-Seal, Inc. ..... Chicago
Joseph Dixon Crucible Co. ..... Jersey City, N. J.
Eastern Clay Products Dept., International Minerals & Chemical Corp. ..... Chicago
Electric Controller & Mfg. Div. ..... Cleveland
Electro Metallurgical Co. ..... New York
Electro Refractories & Abrasives Corp. ..... Buffalo
Encyclopedia Britannica ..... Detroit
Eutectic Welding Alloys Corp. ..... Flushing, N. Y.
Exomet Inc. ..... Conneaut, Ohio
Fanner Mfg. Co., ... Cleveland
F. E. (North America) Ltd. ..... Toronto, Ont., Canada
Federated Metals Div., American Smelting & Refining Co. ..... New York
FOUNDRY ..... Cleveland
Foundry Educational Foundation ..... Cleveland
Foundry Equip. Mfrs. Assoc. ..... Washington
Foundry Equipment Co. ..... Cleveland
Foundry Flask & Equipment Co. ..... Northville, Mich.
Foundry Services Inc. ..... Columbus, Ohio
Fox Grinders Inc. ..... Pittsburgh
Freeman Supply Co. ..... Toledo, Ohio
Fremont Flask Co. ..... Fremont, Ohio
Fritz Hansberg Corp. ..... Chicago
Furane Plastics Inc. ..... Los Angeles
Galland-Henning Mfg. Co. ..... Milwaukee
General Refractories Co. ..... Philadelphia
Girdler Co., Thermex Div. ..... Louisville
Glover Mfg. Co. ..... Meadville, Pa.
Daniel Goff Co. ..... Mauricetown, N. J.
Gray Iron Founders' Society ..... Cleveland
Great Lakes Carbon Corp. ..... New York
Great Lakes Foundry Sand Co. ..... Detroit
Samuel Greenfield Co. ..... Buffalo
Greenlee Bros. & Co. ..... Rockford, Ill.
Harbison-Walker Refractories Co. ..... Pittsburgh
Hardy Sand Co. ..... Evansville, Ind.
Benjamin Harris & Co. ..... Chicago Heights, Ill.
Harrison Machine Co. ..... Westleville, Erie, Pa.
Hartley Controls Corp. ..... Neenah, Wis.
Herman Pneumatic Machine Co. ..... Pittsburgh
Hickman, Williams & Co. ..... Cleveland
Hill & Griffith Co. ..... Cincinnati
Hines Flask Co. ..... Cleveland
Hooker Electrochemical Co., Durez Plastics Div. ..... Tonawanda, N. Y.
Horne & Associates, High Sierra Pine Mills Inc. ..... Reno, Nev.
Frank G. Hough Co. ..... Libertyville, Ill.
Houghton Laboratories Inc. ..... Olean, N. Y.
Hutchinson Shell Mold Co. ..... Alton, Ill.
Hydro-Blast Div., Guardite Co. ..... Wheeling, Ill.
Illinois Clay Products Co. ..... Chicago
Illinois Testing Laboratories Inc. ..... Chicago
Indianapolis Wire Bound Box Co. ..... Fernwood, Miss.
Inductotherm Corp. ..... Delanco, N. J.
International Foundry Supply Co. ..... Reading, Pa.
International Molding Machine Co. ..... LaGrange Park, Ill.
International Nickel Co. ..... New York
Interstate Smelting & Refining Co. ..... Chicago
Iron Lung Ventilator Co. ..... Cleveland
Jeffrey Mfg. Co. ..... Columbus, Ohio
Kaiser Aluminum & Chemical Sales Inc. ..... Chicago
Kindt-Collins Co. ..... Cleveland
King Tester Corp. ..... Philadelphia
Lester B. Knight & Associates Inc. ..... Chicago
H. Kramer & Co. ..... Chicago
Laboratory Equipment Corp. ..... St. Joseph, Mich.
Latrobe Steel Co. ..... Latrobe, Pa.
Lava Crucible-Refractories Co. ..... Pittsburgh
R. Lavin & Sons Inc. ..... Chicago
Lectromelt Furnace Div., McGraw Edison Co. ..... Pittsburgh
Lindberg Engineering Co. ..... Chicago



Linde Co. ..... New York
Link-Belt Co. ..... Chicago
Liquid Carbonic Div., General Dynamics Corp. ..... Chicago
Lowery Brothers Inc. ..... Chicago
Machine Design ..... Cleveland
Magnaflux Corp. ..... Chicago
Magnet Cove Barium Corp. ..... Des Plaines, Ill.
Manley Bros. ..... Chesterton, Ind.
Lyle T. Manley Co. ..... Chesterton, Ind.
Manley Sand Co. ..... Rockton, Ill.
Martin Engineering Co. ..... Neponset, Ill.
Master Pneumatic Tool Co. ..... Bedford, Ohio
J. S. McCormick Co. ..... Pittsburgh
Miller Fluid Power Div., Flick-Reedy Corp. ..... Melrose Park, Ill.
Mine Safety Appliances Co. ..... Pittsburgh
Modern Equipment Co. ..... Port Washington, Wis.
Monsanto Chemical Co. ..... St. Louis
Moulder's Friend ..... Dallas City, Ill.
Nassau Smelting & Refining Co. ... Staten Island, N. Y.
National Air Conveyor Corp. ..... Chicago
National Carbon Co. ..... New York
National Crucible Co. ..... Philadelphia
National Cylinder Gas Co. ..... Chicago
National Dust Collector Corp. ..... Chicago
National Engineering Co. ..... Chicago
National Foundry Sand Co. ..... Detroit
National Metal Abrasive Co. ..... Cleveland
National Safety Council ..... Chicago
New Equipment Digest ..... Cleveland
New Jersey Silica Sand Co. ..... Millville, N. J.
Newaygo Engineering Co. ..... Newaygo, Mich.
Niagara Falls Smelting & Refining Div., Continental Copper & Steel Industries Inc. .... Buffalo
Wm. H. Nicholls Co., Inc. ..... Richmond Hill, N. Y.
Nolan Machinery Co. ..... Pulaski, N. Y.
Non-Ferrous Founders' Society ..... Chicago
North American Smelting Co. ..... Wilmington, Del.
North State Pyrophyllite Co. ..... Greensboro, N. C.
S. Obermayer Co. ..... Chicago
Ohio Crankshaft Co., Tocco Div. ..... Cleveland
Ohio Ferro-Alloys Corp. ..... Canton, Ohio
Olin Aluminum Div., Olin Mathieson Chemical Corp., ... New York
Oliver Machinery Co. ..... Grand Rapids, Mich.
Orefraction Inc. ..... Pittsburgh
Osborn Mfg. Co. ..... Cleveland
Pangborn Corp. ..... Hagerstown, Md.
Pekay Machine & Engineering Co. ..... Chicago
Penn-Rillton Co. ..... New York
Penola Oil Co. ..... Detroit
Penton Publishing Co. ..... Cleveland
George F. Pettinos Inc ..... Philadelphia
Picker X-Ray Corp. ..... White Plains, N. Y.
Pittsburgh Crushed Steel Co. ..... Pittsburgh
Products Engineering Co. ..... Cape Girardeau, Mo.
Pure Carbonic Co., Div. Air Reduction Co. .... New York
Pyrometer Instrument Co. ..... Bergenfield, N. J.
Redford Iron & Equipment Co. ..... Detroit
H. B. Reed & Co. ..... Hammond, Ind.
Rezolin Inc. ..... Santa Monica, Calif.
H. H. Robertson Co. ..... Pittsburgh
Roessing Bronze Co. ..... Pittsburgh
Ross Operating Valve Co. ..... Detroit
Ross-Tacony Crucible Co. ..... Philadelphia
Royer Foundry & Machine Co. ..... Kingston, Pa.
Sand Products Corp. ..... Cleveland
Claude B. Schneible Co. ..... Detroit
A. Schrader's Son ..... Brooklyn, N. Y.
Schramm Inc. ..... West Chester, Pa.
I. Schumann & Co. ..... Cleveland
Scientific Cast Products Corp. ..... Cleveland
Semet-Solvay Div., Allied Chemical Corp. .... New York
Shalco Corp. ..... Palo Alto, Calif.
Shell Equipment Co. ..... Connellsville, Pa.
Shell Process Inc. ..... West Springfield, Mass.
Simplicity Engineering Co. ..... Durand, Mich.
Sipi Metals Corp. ..... Chicago
G. E. Smith Inc. ..... Pittsburgh
Spencer Turbine Co. ..... Hartford, Conn.
Spo Inc. ..... Cleveland
Standard Horse Nail Corp. ..... New Brighton, Pa.
Steel ..... Cleveland
Sterling Wheelbarrow Co. ..... Milwaukee
Frederic B. Stevens Inc. ..... Detroit
Stroman Furnace & Engineering Co. ... Franklin Park, Ill.
Sutter Products Co. ..... Holly, Mich.
Tabor Mfg. Co. ..... Lansdale, Pa.
Taggart Brimfield Co. ..... Hammonton, N. J.
G. H. Tennant Co. ..... Minneapolis
Tylene Plastic Co. ..... Michigan City, Ind.
United Oil Mfg. Co. ..... Erie, Pa.
United States Electrical Tool Co. ..... Cincinnati
United States Forge & Foundry ..... Pulaski, N. Y.
United States Gypsum Co. ..... Chicago
U. S. Reduction Co. ..... East Chicago, Ind.
Valvaire Co. ..... Akron, Ohio
Vanadium Corp. of America ..... New York
Vesuvius Crucible Co. ..... Pittsburgh
Westinghouse Electric Corp. ..... Baltimore
Westover Corp. ..... Milwaukee
Wheelabrator Corp. ..... Mishawaka, Ind.
Whirl-Air-Flow Corp ..... Minneapolis
Whitehead Brothers Co. ..... New York
White Pine Lumber Co. ..... Chicago
Whiting Corp. ..... Harvey, Ill.
Yale & Towne Mfg. Co. ..... Philadelphia

What's New in Foundry Equipment

Looking for the latest in new equipment and supplies? Here are descriptions of more than a hundred new or improved items introduced recently. For more information on them, check the reply card on Page 285. Starred ★ items are products of companies exhibiting at the AFS Foundry Show in Cleveland, May 19-23

Sand Preparation

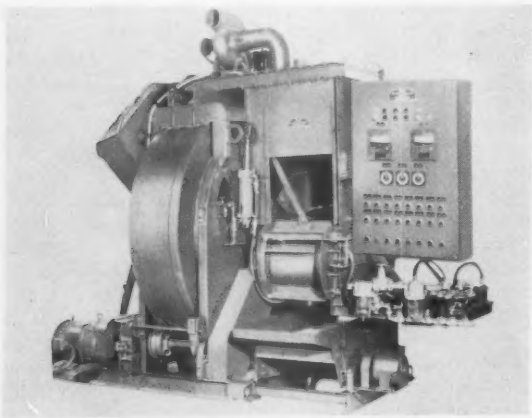
SAND COOLING DEVICE*

Variable and controlled cooling of foundry sand is claimed for a device using a "sand storm" arrangement which provides good air-sand contact. The unit is designed to reduce sand temperature to a minimum of 105° F and maximum of 125° F as sand enters a storage bin or preparation equipment. In some cases the sand cooler may be used as an elevator or bucket loader.—**National Engineering Co.**, 646 Machinery Hall Bldg., Chicago 6, Ill.

For More Details Circle No. 341—Page 285

SAND COATING MACHINE*

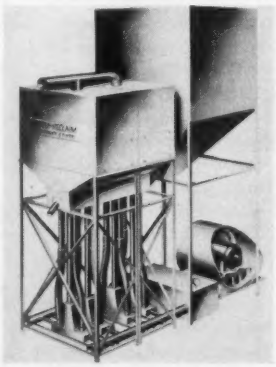
Machine coats sand with resin for use in making shell molds and cores. Sand first is heated to 350° F in a gas-fired, rotary drum. Hot sand then is charged into a twin-shaft pugmill where the resin and accelerator are added. The resulting mix is passed through a series of screens and discharged as free-flowing, lump-free coated sand ready for use. Cycle time is 5 minutes for a 300-lb batch; the machine has a rated capacity of 3000 lb an hour.—**C & S Products Co.**, 18656 Fitzpatrick, Detroit 28, Mich.



For More Details Circle No. 342—Page 285

SAND RECLAMATION UNIT*

Pneumatic sand reclamation unit can be integrated with overhead sand handling and storage systems. For foundries without an overhead sand system, it is available as a package system. The unit magnetically separates, elevates, breaks lumps, screens, feeds, scrubs, and temporarily stores reclaimed sand. Control of quantity and quality is achieved by a simple discharge setting. Scrubbers are built in basic two-compartment units which may be joined in sequence to provide two, four, six, or eight-compartment scrubbers. Sand-air balance is established by damper controls, and positive control of fines is provided. Other features provide for easy maintenance.—**Beardsley & Piper, Division of Pettibone Mulliken Corp.**, 2424 North Cicero Ave., Chicago 39, Ill.



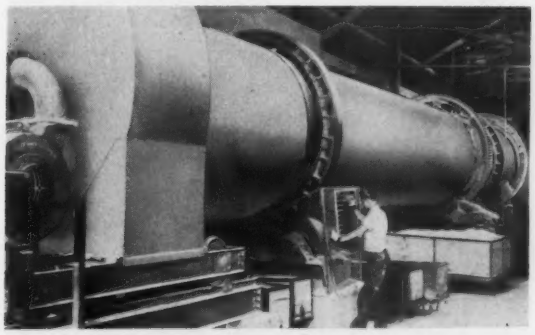
For More Details Circle No. 343—Page 285

SAND RECLAIMER KILN*

Kiln is designed for sand reclamation systems associated with the burning out of resin, core oil, and other organic materials. It incorporates an

and Supplies

integral predryer section which accelerates the heating of incoming material, reduces temperature of outlet gases, and increases over-all fuel economy,

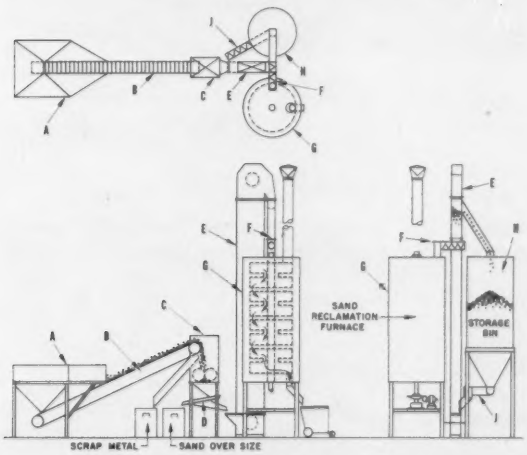


it is claimed. The unit is available in sizes to provide a capacity ranging from 2 to 20 or more tons an hour. Fuel may be either gas or oil.—**C. O. Bartlett & Snow Co.**, 6200 Harvard Ave., Cleveland 5, Ohio.

For More Details Circle No. 344—Page 285

SHELL SAND RECLAIMER

Package system is designed for thermal processing of shell molding and other sand for re-use. Equipment in the system consists of: A. Sand receiving hopper. B. Belt conveyor with magnetic head pulley. C. Sand crusher. D. Sizing screens. E. Bucket elevator. F. Feed control screw. G. An eight-hearth furnace. H. Sand storage bin. J. Bin transfer screw.

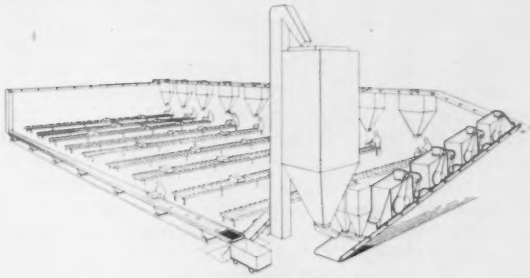


In addition, the company offers a 2 ft 3 in. ID, four-hearth pilot plant unit for sand reclamation testing. It may be rented or purchased.—**Nichols Engineering & Research Corp.**, 70 Pine St., New York 5, N. Y.

For More Details Circle No. 345—Page 285

GREEN SAND SYSTEM*

Green sand preparation and distribution system conditions and elevates sand simultaneously on the inclined conveyor belt as illustrated. Features claimed are that it can be installed in a low headroom area, needs a minimum number of excavations and elevators, and has unlimited sand capacity. Also, production loss due to mechanical breakdown is minimized because individual sec-



tional drives are said to overcome complete unit stoppage if a breakdown occurs in any part of the mixer-muller. Items in the system can be purchased in stages, permitting gradual progress to complete mechanization.—**Pekay Machine & Engineering Co.**, 865 North Sangamon St., Chicago 22, Ill.

For More Details Circle No. 346—Page 285

SAND MIXER*

Blending pan of this mixer is doughnut-shaped, with the drive motor mounted in a column in the center area. Principle of the design is that material near the periphery of a circular pan moves the greatest distance in a given time interval. Therefore, by closing off the center of the pan the area of slow-moving material has been eliminated.

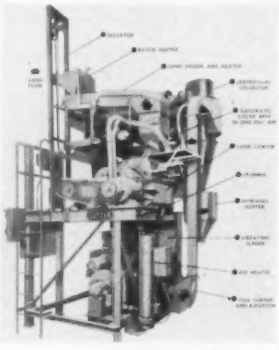
Material is mixed by a series of blades positioned to produce a braiding action. This is said to pro-

duce a live mix that moves at 9 ft per second. Thorough blending of sand and additives is said to be achieved in a short time. Other features claimed are that the mixer is nearly vibrationless and can operate without hold-down devices. It is equipped with a hook for handling by monorail crane and will mix while transporting the batch. It is available in ½, 1, and 1½-cu-yd capacities. The mixer is made by T. L. Smith Co., Milwaukee, under license agreement with Erik Fejmert, Swedish inventor. — **Illinois Clay Products Co.**, 208 South La Salle St., Chicago 4, Ill.

For More Details Circle No. 347—Page 285

SAND COATING UNIT*

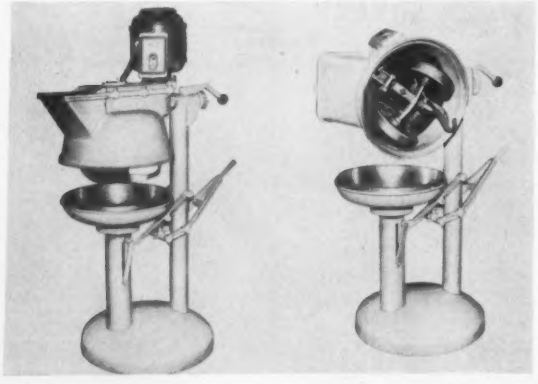
Package unit for coating sand with resin has a capacity of 6000 lb of sand an hour based on a 400-lb batch. Batch sizes, however, may be varied from 250 to 400 lb. The machine has a 1200-lb capacity uncoated sand storage hopper which can be filled by a skip hoist loader or elevator. Sand flows from it to the adjustable batch hopper, thence to a combination vibrating pan feeder and heater. Gas or electric heat may be used. Heated sand flows into a second batch hopper and then into the coater where either liquid or powdered resin and other additives are added in timed sequence. Cool, warm, or hot air may be introduced as desired. When breakdown of the coated sand occurs, bottom doors of the coater open and the sand goes through a roll crusher onto a vibrating screen and through a cooler to a 2000-lb capacity storage hopper with automatic valve through which sand is fed to a distribution system. —**Sutter Products Co.**, 407 Hadley St., Holly, Mich.



For More Details Circle No. 348—Page 285

LABORATORY SAND MULLER*

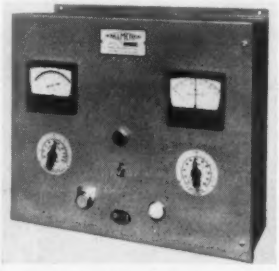
Rubber-tired mulling with spring loading, contoured bowl, and new plow design provide high mulling efficiency for laboratory sand control and experimentation. The redesigned plow is said to leave no unmixed material in the center of the contoured bowl. Other changes include a larger inspection door and greater space between the bowl and mulling mechanism in the open position to permit easy loading without removing the bowl. The bowl, however, may be removed and carried to a laboratory bench or into the foundry for loading. Several bowls can be used with one muller. Mulling mechanism can be tipped and locked to right or left for cleaning. It returns to mulling position when locking lever is released.—**Beardsley & Piper, Division of Pettibone Mulliken Corp.**, 2424 North Cicero Ave., Chicago 39, Ill.



For More Details Circle No. 349—Page 285

SAND MOISTURE METER*

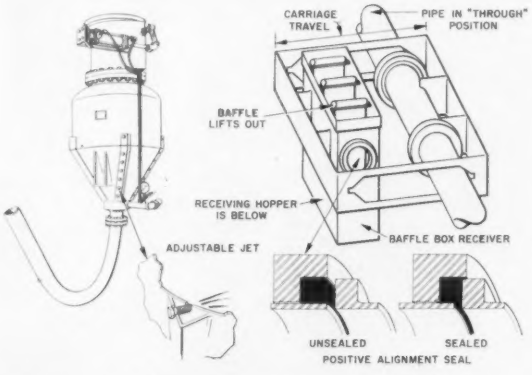
An accessory for sand mullers is designed to indicate the moisture content of a batch of molding sand during the mulling cycle. The muller operator may read the moisture content and temperature of the sand from conveniently placed meters and thus control additions of water until a predetermined moisture content is achieved. In such a way sand can be prepared with the required moisture level best suited to the making of molds that will produce castings of uniform high quality.—**Harry W. Dietert Co.**, 9330 Roselawn Ave., Detroit 4, Mich.



For More Details Circle No. 350—Page 285

PNEUMATIC SAND CONVEYOR*

Improvements in the company's system for pneumatically transporting sand mixtures include an improved transporter, newly designed diversion valve, easy-open pipe couplings, simplified baffle box receiver, adjustable air jets, and improved booster fittings. The new diversion valve is illustrated at right in the "through" position. The baffle box receiver, which forms part of the valve, has simple, lift-out rubber baffles to deflect sand to hopper below. The transporter unit is shown at left with a detailed drawing of an adjustable air jet for governing air pressures used. Transporters are available in capacities of 7½, 15, 30, and 40 cu ft.—**National Air Conveyor Corp.**, 549 West Washington St., Chicago, Ill.

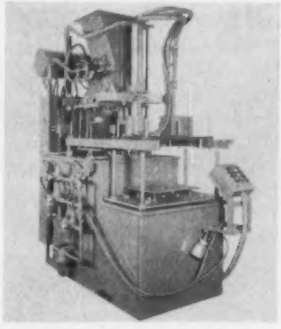


For More Details Circle No. 351—Page 285

Coremaking and Molding

SHELL BLOWING MACHINE*

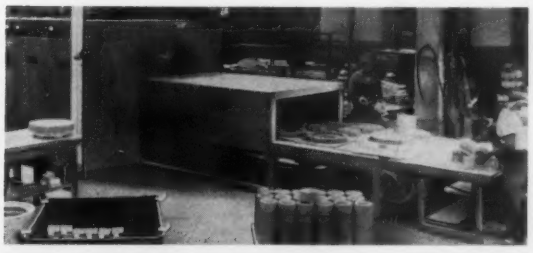
Automatic machine blows resin-coated sand into electrically heated boxes to produce shell molds or cores within 30 seconds. The machine will make contoured molds, hollow or solid cores, or liner cores. Maximum core size is 15 x 20 x 30 in. high; for molds it is 20 x 30 x 15 in. draw. The two-station, rotary, automatic blow machine features vertical or horizontal parting fixtures for the boxes; a hydraulic system with cam controls for rotating and indexing, and input controllers for maintaining uniform temperature of boxes. Semiautomatic or fully automatic operation is controlled from a bushbutton panel on the front of the machine. The only manual operation is removal of molds or cores every 30 seconds.—**C & S Products Co.**, 18656 Fitzpatrick Ave., Detroit 28, Mich.



For More Details Circle No. 352—Page 285

DIELECTRIC CORE OVEN*

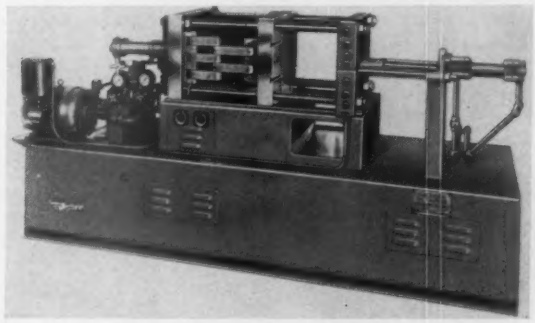
Up to 10,000 lb of phenol resin-bonded cores can be baked an hour in the company's 200-kw dielectric oven, it is claimed. Cores are on the conveyor for about 12 minutes. One of these ovens installed in a midwest steel foundry is said to handle production from seven coreblowing machines. Other dielectric ovens are available in standard models ranging from 30 to 200 kw power output capacity. —**Foundry Equipment Co.**, 1821 Columbus Rd., Cleveland 13, Ohio.



For More Details Circle No. 353—Page 285

DIE CASTING MACHINE

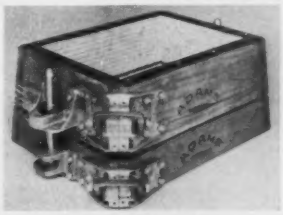
Cold chamber machine for aluminum, magnesium, and brass is designated Model 150A and is said to have all features and workmanship of larger, costlier machines. It has a shot capacity of 2½ lb at a rate up to 350 shots per hour. Minimum die thickness is 6 in.; maximum is 16 in. Machine features 150-ton locking pressure, 20 x 21-in. solid steel die platens, 10-in. shot cylinder stroke, plunger tip diameter of 1½-2 in., and automatic electric cycling at high speed. Standard or fire-resistant fluids may be used in hydraulic unit. Also available is a hot chamber machine, Model 150Z, with hydraulically operated plunger, goose neck type for zinc, tin, and lead.—**American Die Casting Machinery Co.**, 1744 W. Winona St., Chicago 40, Ill.



For More Details Circle No. 354—Page 285

FLASK RELEASE UNITS*

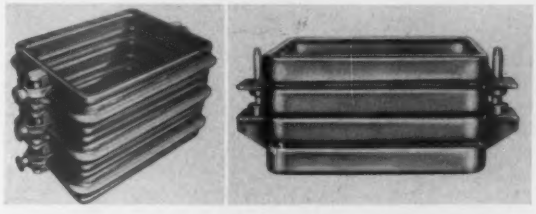
Improved release mechanisms for loosening flasks prior to removal from molds are almost completely enclosed in an aluminum alloy body which forms an operating corner of high strength and minimum weight. The units feature simple adjustment and part replacement. Also, they are said to decrease wear in the two most vital flask areas, permitting close flask tolerances. Illustrated here on a cherry flask, the units also are available on aluminum flasks.—**Adams Co.**, Dubuque, Iowa.



For More Details Circle No. 355—Page 285

CORRUGATED FLASKS*

Inside corrugations in the ¼-in.-thick walls of these flasks are designed to provide additional strength and rigidity. The corrugated walls resist deflection under molding pressure and assist in holding the sand. The flasks are said to maintain their shape and pin centers over long service. The number of inside corrugations is determined by depth of sections. Where resistance to extreme pressure is required, flasks may be furnished with addi-



tional channel welded reinforcement.—**American Foundry Flask Co.**, 2745 Southwest Blvd., Kansas City 8, Mo.

For More Details Circle No. 356—Page 285

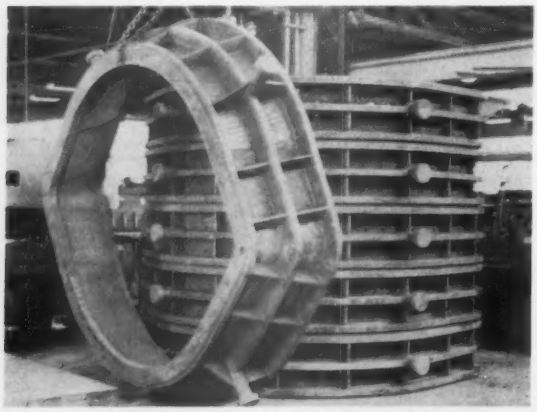
CORE BLOWER*

Single station machine is designed to perform the core blowing cycle in two seconds. Either of two blowheads may be used on the machine—a funnel head for jet blow or a reservoir head with quick change blowplate. The stationary head is said to eliminate shifting or indexing of the reservoir for filling. The machine table hydraulically adjusts and locks to optimum corebox space. The jet stream feeds sand directly into the corebox. Small and compactly designed, the machine is intended for use in semiproduction or jobbing foundries. Also to be displayed at the show is an automatic vibrating squeeze pin lift molding machine which features a lifting frame for stripping cope and drag halves after they have been produced simultaneously and an automatically cycled hollow shell coreblowing machine with self-contained gas-fired heating.—**Osborn Mfg. Co.**, 5401 Hamilton Ave., Cleveland 14, Ohio.

For More Details Circle No. 357—Page 285

LARGE STEEL FLASKS

The company has installed new equipment for producing very large steel flasks such as those illustrated here. The sections of this equipment



measure 100 in. ID and are 19 in. deep. Flanges are 2½ x 6 in., sidewalls are 1¼-in. thick, and each section weighs over 6000 lb.—**Shanafelt Mfg. Co.**, 2600 Winfield Way N.E., Canton 5, Ohio.

For More Details Circle No. 358—Page 285

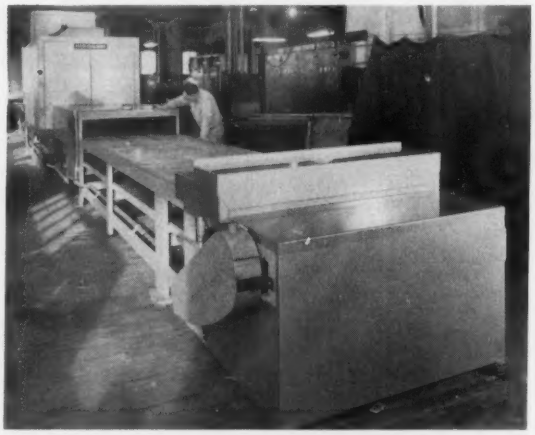
SHELL MOLDING MACHINE*

Two shell molding machines for shell sizes 20 x 30 in. and 26 x 40 in., respectively, feature improved heavy-duty driving units and J.I.C. type controls for gas and electrical equipment. The machines employ the same simple rollover mechanism as used in the previous design. All machines are gas heated. Continuous heat is maintained under the patterns, and a damper provides selective heating for each side. Heat is applied in the oven only when the machine is in the curing position.—**Hutchinson Shell Mold Co.**, Box 188, Alton, Ill.

For More Details Circle No. 359—Page 285

DIELECTRIC CORE HEATER

Line of dielectric heaters has been extended to include units up to 200 kw. As shown here the equipment consists of a power cubicle, oscillator section, and oven, measuring 69 ft long. Adjustable electrode control compensates for physical variances in cores to eliminate burning and incomplete baking even when cores have very thick or very thin sections, it is claimed. With no cooling time re-

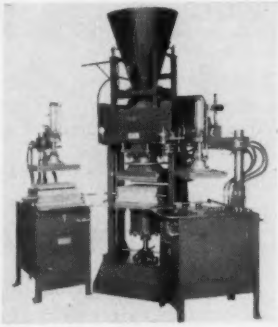


quired, storage space for stock build-up can be reduced. It is said that fuel costs are reduced because oven need not be preheated or kept hot. The heater is ready for operation within 30 seconds.—**Allis-Chalmers, Industrial Equipment Division**, Milwaukee 1, Wis.

For More Details Circle No. 360—Page 285

CO_2 MOLDING EQUIPMENT*

Equipment setup for making CO_2-hardened molds consists of a standard coreblower and coreshooter equipped with a special magazine head assembly incorporating a simple squeeze plate and two gassing and stripping machines. Two aluminum, brass, or plastic mold boxes are used. While one is blown and squeezed the other is gassed and stripped automatically in 17 seconds. The top face of blown molds is higher than the outside frame of the mold box. Sand is squeezed flush when the mold is raised against the squeeze plate which has been rolled underneath the blowplate. Mold thickness is determined by pat-

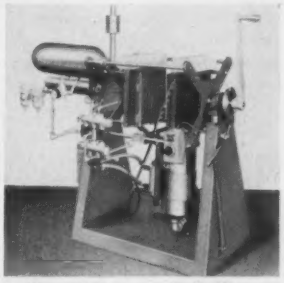


tern box height. One-half inch of sand above the pattern is considered ample. Maximum height of half molds is 3 in., and average mold size in production is 10 x 14 in.—**Redford Iron & Equipment Co.**, 20733 Glendale, Detroit 23, Mich.

For More Details Circle No. 361—Page 285

SHELL COREBLOWER*

Manually operated, bench model machine is designed for the production of small and medium size shell cores in either jobbing or production quantities. Maximum core size is 10 x 14 x 6 in., and production is at the rate of 50 to 90 cycles an hour. The company also offers a muller made by Shallway Muller Corp., Cambridge, N. Y. It is designed for cold coating of sand for the shell molding and shell core processes. For that purpose a drying attachment is used to produce dry, coated sand. The muller also is said to prepare green sand and oil sand mixes.—**Shell Equipment Co.**, Ninth & W. Crawford Ave., Connellsville, Pa.



For More Details Circle No. 362—Page 285

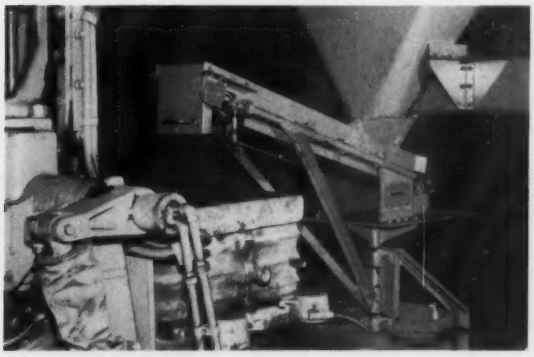
SAND RAMMER

Short, light, compact sand rammer has a double-action, self-adjusting seal which prevents sand and dirt from entering the bore of the guide or the barrel. Other features include a rubber-faced throttle valve, designed to close tightly even if small particles of dirt are on the valve seat, and a flapper valve intended to pass dirt that may be in the air line. The rammer comes in over-all lengths of 17¼, 19⅜, and 44⅛ in.—**Ingersoll-Rand Co.**, 11 Broadway, New York 4, N. Y.

For More Details Circle No. 363—Page 285

PIVOTING FLASK FILLER*

High-speed, high-capacity belt feeder is designed to receive sand from storage hoppers, plate feeders, belt conveyors, elevators, or overhead bucket and

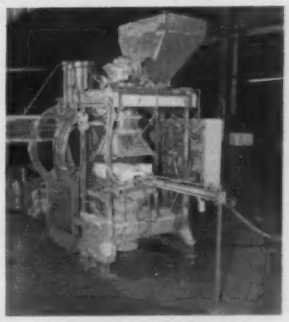


spread it uniformly in large flasks resting on roll-over machines or on the floor. The unit has a capacity of up to 50 cu ft of sand a minute, anti-friction ball bearings, quick adjusting belt take-ups, and a rubber-covered, endless belt. The machine is balanced accurately to permit easy swinging for sand distribution. Special arrangements of the units can be provided to suit all set-ups.—**Newaygo Engineering Co.**, Newaygo, Mich.

For More Details Circle No. 364—Page 285

CO_2 MOLDING SYSTEM*

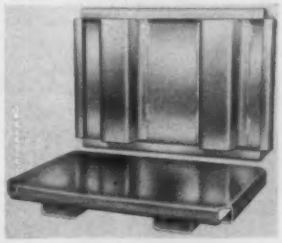
Completely automated system is designed for the production of sodium silicate-bonded, CO_2-hardened molds ready to be closed. The complete system consists of a combination of tried and proven machines assembled to produce molds from matchplate patterns at the rate of one every minute. The system is said to be well-suited to multiple molding or stack molding operations. Push-buttons simplify control of the entire series of operations from squeeze to finished molds.—**International Molding Machine Co.**, La Grange Park, Ill.



For More Details Circle No. 365—Page 285

SQUEEZE-IN BOTTOM BOARDS*

Aluminum squeeze-in bottom boards are fabricated from high strength aluminum sheet welded by the gas shielded arc process. The alloy has an as-rolled and tempered tensile strength of 38,000 to 47,000 psi. It is said that the bottom boards will not fracture or crack in foundry usage. The design has been field tested on the squeezer floor of several steel foundries. The boards remained straight under all conditions of radiated heat, even when the mold was held on the board until cold, according to the manufacturer. Weld areas remained sound under squeezing action and shakeout; however, prolonged contact with red hot castings was avoided.—**Sterling Wheelbarrow Co.**, Milwaukee 14, Wis.



For More Details Circle No. 366—Page 285

FLEXIBLE MOLD JACKETS*

Developed to eliminate shifts and runouts, these flexible mold jackets are designed to line up automatically with the sides of molds made in flasks assembled on any standard taper. The jackets are available in cast iron or cast aluminum in 4½, 6, and 7½-in. depths. Other depths will be available later. A feature of the jackets is the provision for easy replacement of

a side or end with completely machined and drilled replacement units. The defective section can be replaced by removing two nuts, inserting the new section and replacing the nuts.—**Fremont Flask Co.**, 1000 Wolfe Ave., Fremont, Ohio.

For More Details Circle No. 367—Page 285

DRYING OVEN*

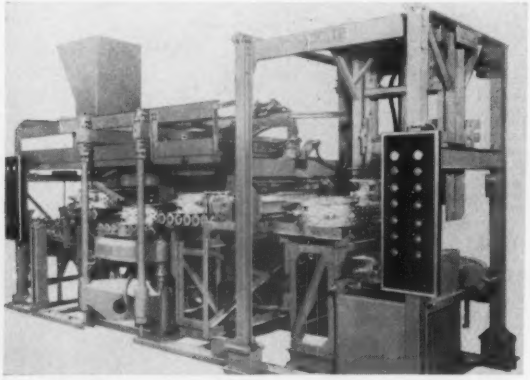
Drying oven uses the principle of reverse-flow heating in which hot air is circulated downward from headers in the roof and recirculated through a trench in the oven floor. This method is said to provide uniform and complete drying of large loads

because they are immersed completely in a uniform hot air bath with no chance for a short circuit in the air flow.—**Carl Mayer Corp.**, 20800 Center Ridge Rd., Cleveland, Ohio.

For More Details Circle No. 368—Page 285

AUTOMATIC DRAG MOLDER*

Automatic jolt-squeeze drag molding machine operates on air-to-air control throughout. No limit switches or other electrical controls of any kind are used. The machine is equipped with air-operated, car-type squeeze head, pneumatic pattern draw, and built-in flask roll-in and mold roll-out device with measuring sand hopper, flask indexing device and

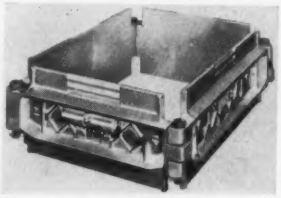


sand spill upset, flask feed-in elevator, mold turnover, and mold transfer. It is designed to make, close, and remove 240 molds an hour automatically and continuously.—**Wm. H. Nicholls Co.**, Richmond Hill 18, Long Island, N. Y.

For More Details Circle No. 369—Page 285

FLEXIBLE MOLD JACKETS*

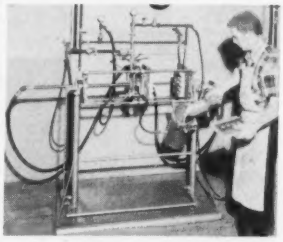
A special pivot pin arrangement at the four corners produces a flexibility that permits these jackets to assume the shape of the mold and adjust automatically to mold taper. Relationship of jackets to the mold parting line can be changed by inserting larger or smaller diameter pins in the corners of the jackets. In the same way the jackets can be adjusted to fit molds made in slip flasks or release flasks. The jackets are cast of aluminum or iron in all sizes. A high degree of accuracy is achieved by fitting and assembling jacket components on jigs and fixtures.—**Hines Flask Co.**, 3431 W. 140th St., Cleveland 11, Ohio.



For More Details Circle No. 370—Page 285

SHELL CORE MACHINE*

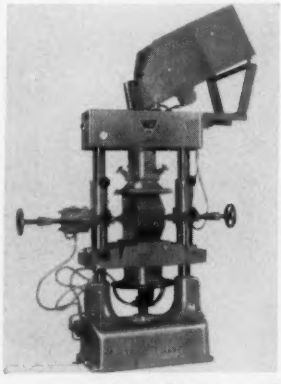
Shell core machine features a complete system of automatic valves and controls preassembled on a wall panel and a full set of production accessories. They include a blow-off gun, silicone spray gun, air and gas hoses and fittings, and surface thermometer. The machine will handle long-run jobs, and, because of its quick corebox change features, also fits well into jobbing shops where short runs are encountered. Heat is applied directly to the backs of corebox halves by gas flame. The machine is said to produce intricate small cores in four gang boxes at the rate of ten a minute. Cores up to 9 in. in diam or 18 in. long are made at the rate of one a minute.—**Dependable Pattern Works**, 1634 S. E. Seventh Ave., Portland 14, Oreg.



For More Details Circle No. 371—Page 285

CORESHOOTER*

Latest in the company's line of coreshooters is Model KSA 210, which is designed to produce simple or complicated cores in metal or wood coreboxes with a minimum of abrasive wear on the boxes. The machine is said to offer fast changeover of patterns for short-run jobs, economy of air consumption, and a hard ram. The shooting cycle is less than one second. The machine has no rotating shafts, bearings, motors, switches, relays, or plows. It operates entirely on compressed air. Machine frame is cast steel with machined steel columns that keep shoot plate and table aligned. —**Carver Foundry Products Co.**, Muscatine, Iowa.



For More Details Circle No. 372—Page 285

Material Handling

MOLD DUMPS and TRACK*

Heavy-duty track is designed to handle coreboxes up to 9 ft wide and weighing 10,000 lb. The coreboxes are bridged over several double-wheeled dollies, as shown here. The track may be adapted to carry other large or heavy loads by using fabricated metal pallets or carriers.

The company also offers movable mold dumps which enable one operator to separate sand and castings from roller-equipped bottom boards or pallets and return the boards to molders by conveyor. The mold dump rides on transfer track and serves several lines. One model dumps by gravity into a device lower than track height. Another is a powered, elevating unit which dumps at a height above the track. Both units are designed to handle a wide range of mold sizes.—**Nomad Equipment Division, Westover Corp.**, 3110 West Fond Du Lac Ave., Milwaukee 10, Wis.

For More Details Circle No. 373—Page 285

PNEUMATIC CONVEYOR*

Portable pneumatic conveyor for foundry sand is offered in 5, 9, and 18-cu-ft capacities. Little floor space and head room are required for the unit, which is designed to fit existing buildings without structural change. The conveyor will serve one station, or, with the use of transfer switches, a number of stations. The unit is said to handle shakeout sand, molding sand, oil-bonded core sand, sand containing air-setting binders, resin-coated sand, washed and dried silica sand, bentonite, and seacoal. It is claimed that the unit delivers dry materials with little segregation; shakeout sand is cooled in the process of delivery, and molding and core sands are delivered properly aerated and with moisture well absorbed.—**Whirl-Air-Flow Corp.**, 650 25th Ave., S. E., Minneapolis 14, Minn.

For More Details Circle No. 374—Page 285

FRONT-END LOADER*

Rubber-tired, front-end loader has a capacity of 2500 lb. Its turning radius is 6 ft to the outside rear hub, and it has a dumping height clearance of 5 ft 4½ in. Among features of this new machine are a new power-shift transmission matched with a torque converter to provide good speed of movement and ease of operation, power steering, and a power transfer differential which transfers more torque to the drive wheel with the best footing when slippage is encountered. The machine is offered

with a choice of gasoline, diesel, or LPG engines. Different size buckets are available so that the average weight of material to be handled can be matched to the carrying capacity of the truck. Interchangeable front-end attachments include pick-up sweepers, hydraulic grab devices, crane hook, tine buckets, scrap buckets, and snow plows.—**Frank G. Hough Co.**, 703 Seventh Ave., Libertyville, Ill.

For More Details Circle No. 375—Page 285

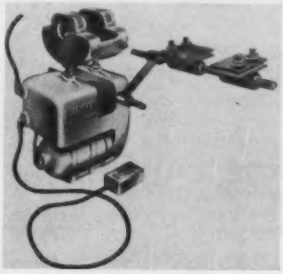
SLING CHAIN HOOKS*

A line of foundry hooks for use on sling chains is available for chain sizes of ¼, ⅜, ½, ⅝, ¾, and ⅞ in. Sling chains offered by the company consist of a master link which slips over the hoist hook, a coupler, length of chain, a sling hook or grab hook, and load pins for assembling the components. Those parts are made of heat-treated alloy steel. Drive pins for holding load pins in place are stainless steel. The company maintains localized service outlets to offer fast delivery of complete sling chains and component parts for replacement. The slings are designed for easy repair in the foundry.—**American Chain & Cable Co.**, York, Pa.

For More Details Circle No. 376—Page 285

BRIDGE CRANE DRIVE UNITS

Line of power units to convert manually operated crane bridges to electric drive has been expanded to include cushion start models. Smooth acceleration and braking make them well suited to handling ladles of molten metal. At full speed, the bridge travels at a moderate walking speed, the operator controlling bridge movement with a 24-v pushbutton station suspended from the unit. The bridge drives have antifriction bearings; gears operate in an oil bath. Mod-

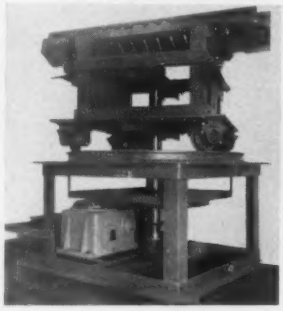


els are available for 220, 440, or 550 v; all have fully enclosed speed reducer, squirrel cage motors and magnetic contactor controllers. — **Manning, Maxwell & Moore Inc., Shaw-Box Crane & Hoist Division,** 386 West Broadway, Muskegon, Mich.

For More Details Circle No. 377—Page 285

HEAVY DUTY TURNTABLE

Designed to handle up to 30,000 lb, this turntable is mounted on a rotating carriage supported on four flanged wheels having shafts mounted in antifriction pillow blocks and running on circular track. Turntable is powered by electric motor and speed reducer through gear and pinion drive. Although not included in the illustration, the motor is mounted on the base plate visible in rear. The chain and sprocket drive, shown near base of main pivot shaft, operates a cam limit switch which brakes motor for stopping turntable at predetermined points.— **Logan Co.,** 580 Cabel St., Louisville 6, Ky.



For More Details Circle No. 378—Page 285

PALLET CONTAINERS

The addition of two models to the company's line of welded rod mesh pallet containers now makes available drop side units for stacking and handling small parts. The top half of one side is hinged and may be dropped down, affording easy access to all corners of the container. The new models measure 32 x 40 x 28 in. high and 40 x 48 x 30 in. high. Interlocking channel understructure, positive stacking legs, and the flat folding feature for easy storage and shipment characteristics of other models are retained in the new units.—**Union Steel Products Co.,** Albion, Mich.

For More Details Circle No. 379—Page 285

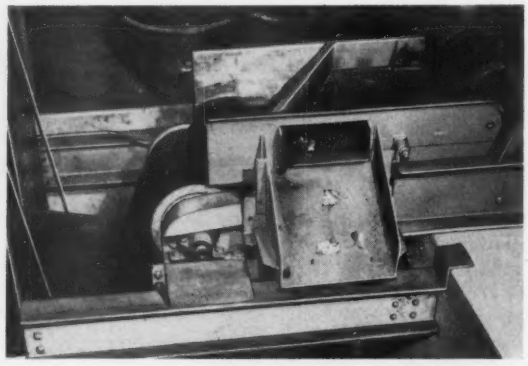
AIR-POWERED HOIST*

Air-powered hoist available in 1000 and 2000-lb load-lifting capacities is offered with either roller or link chain and manual or pendant controls. The new pendant control was designed to use comparatively few parts. Hoists are protected against dirt and external damage. Levers, valve stems, and other external parts which are subject to damage from dirt and abuse are eliminated from the lift, descent, and stop control. The hoists are said to be compact and rugged and to have built-in safety devices beyond normal safety standards.— **Master Pneumatic Tool Co.,** Krick Rd., Bedford, Ohio.

For More Details Circle No. 380—Page 285

VIBRATING CONVEYOR

Vibrating screen conveyor is available in capacities from 10 to 50 tons an hour. It is arranged with side discharge for lumps of material and larger pieces of tramp metal. Part of the conveyor pan is made of stainless steel to prevent magnetization.

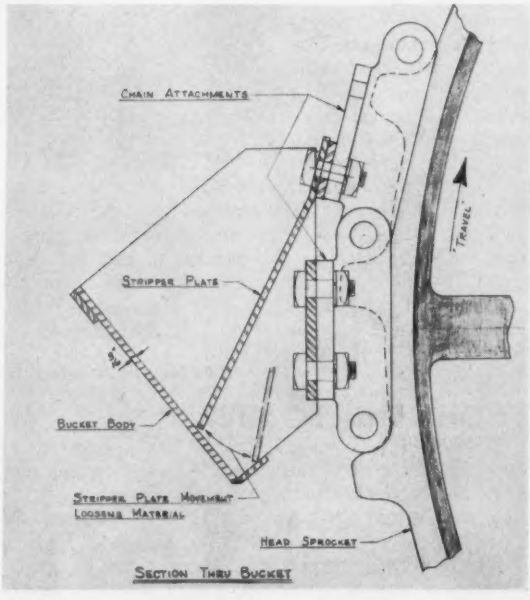


The unit may be furnished with or without a magnetic separator, thus offering customers the opportunity to use existing magnetic separation equipment. —**Ajax Flexible Coupling Co.,** Westfield, N. Y.

For More Details Circle No. 381—Page 285

SELF-CLEANING BUCKET*

Self-cleaning elevator bucket was developed for mounting on chain attachments to elevate tempered foundry sand with complete discharge of material. Buckets are designed for individual applications to insure proper stripper plate movement. They are available in all sizes. Chain-mounted buckets are an

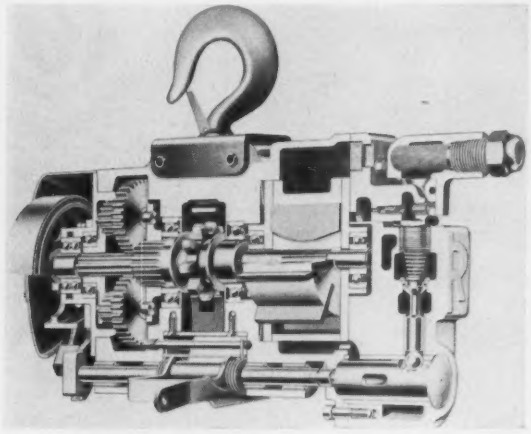


addition to the self-cleaning, belt-mounted buckets made by the company.—**Pekay Machine & Engineering Co.**, 865 N. Sangamon St., Chicago 22, Ill.

For More Details Circle No. 382—Page 285

PORTABLE AIR HOISTS

Lightweight, portable, air hoists are offered in 1000 and 2000-lb capacities. The smaller unit weighs 39 lb and lifts its rated load at 40 fpm. The 2000-lb hoist weighs 56 lb and lifts at 20 fpm. Features include a mechanically operated brake automatically applied when controls are released or, if air supply stops, lowering of the load may be controlled by the brake; graduated control for accurate load spotting; built-in lubrication system for motor and gearing;

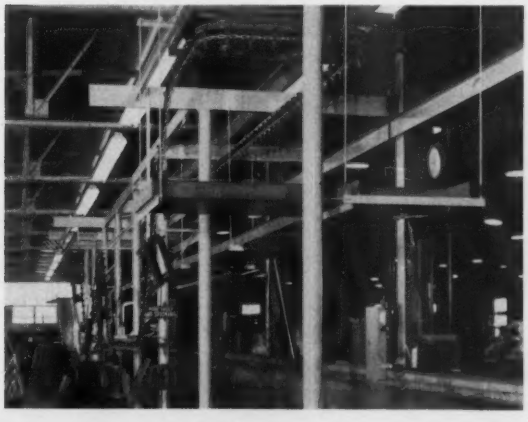


built-in air strainer, and stops to prevent overrun of chain in either direction. The hoists are available with roller or link chain.—**Ingersoll-Rand Co.**, 11 Broadway, New York 4, N. Y.

For More Details Circle No. 383—Page 285

TROLLEY CONVEYOR

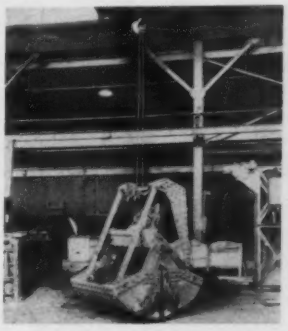
Light-duty, sprocket-driven trolley conveyor is available in capacities from 350 to 750 lb and horsepower ratings from ¼ to 2. The monorail is light and designed for easy installation with rod or angle hanger supports. Standard vertical bends are made in 2, 4, and 6-ft radii. Sprocket turns are available in 30, 45, 60, 90, and 180-degree units. Spread type and 180-degree sprocket type take-up assemblies are standard. Trolley wheels with either an oil hole or a grease fitting were developed specifically for trolley conveyor service.—**Mathews Conveyer Co.**, Ellwood City, Pa.



For More Details Circle No. 384—Page 285

HOOK-ON BUCKETS*

Single line, hook-on buckets can be hooked on or taken off a crane hook in seconds; thus they are adapted to intermittent service. The buckets have a three-point toggle link mechanism and a safety hub trip which is said to prevent opening of the bucket when it is being carried overhead. They are available in 1/5 to 3 cu yd capacities in a closed head model where ample headroom is available, an open head model where operating headroom is limited, and in a low headroom type for use in minimum overhead space.—**Blaw-Knox Co., Blaw-Knox Equipment Division**, Pittsburgh 38, Pa.



For More Details Circle No. 385—Page 285

HIGH-LIFT MAST*

A triple section mast for high stacking with industrial lift trucks is said to offer good operator visibility and channel stability. Lifting is accomplished by three nested, I-beam lifting members which are raised hydraulically by a multistage lift cylinder. The mast is offered in standard over-all heights of 59, 65, 71, 83, 90, and 96 in. which give maximum fork heights of 108, 126, 144, 162, 180, 201, and 216 in., respectively. Masts have capacities of 3000, 4000, and 5000 lb and may be used on all company electric and gas-powered trucks.—**Yale & Towne Mfg. Co., Yale Materials Handling Division**, 11000 Roosevelt Blvd., Philadelphia 15, Pa.

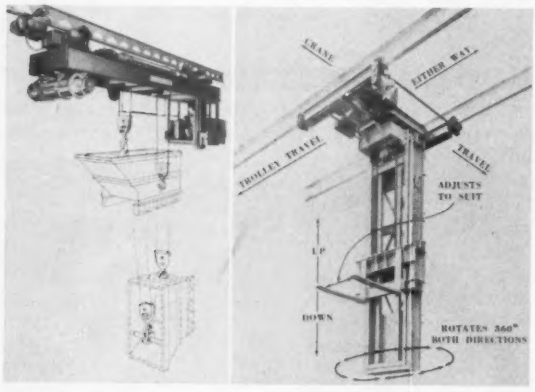
For More Details Circle No. 386—Page 285

TRAM RAIL EQUIPMENT

Cab-controlled, twin-hook hoist carrier provided with an auxiliary hoist for dumping is designed to pick up boxes of material, haul them and empty by tipping. Shown at left, the equipment features weather-proof construction for outdoor or indoor service. Hoisting and travel motions are controlled by the cab operator. Hoist speed is 35 fpm; travel speed is 250 fpm. Variable speed drum controllers are provided. Capacity is 6000 lb per hook, but other

carriers of different capacities can be furnished.

The crane-mounted overhead fork lift shown at right is electrically driven forward, backward, sidewise, up, down, and turned through a full circle clockwise or counterclockwise. The lift may be ob-

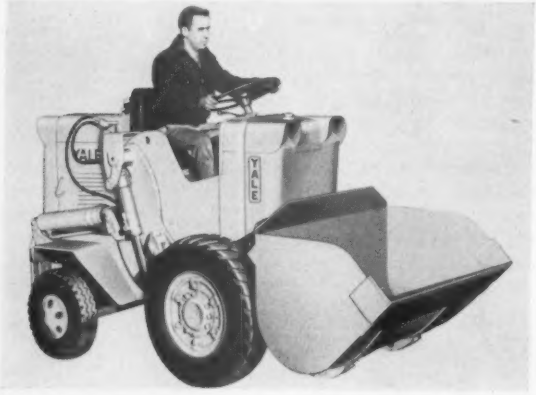


tained with any or all of those motions and for motorized or manual operation. Operator has full vision for all positions of his work. Because of the flexible control cable, he can operate the unit at a safe distance from the load, or a riding platform or cab can be provided. Fork lifts are available for various capacities and lifts. The unit illustrated is a telescoping type with 5000-lb capacity.—**Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.**

For More Details Circle No. 387—Page 285

TRACTOR SHOVEL*

Model Y-18 tractor shovel has a 2500-lb carrying capacity, 6-ft high dumping clearance, automatic torque transmission, acceleration of 0 to 8 mph in 3½ seconds, top speed of 13 mph, and 45 degree bucket tip-back at ground level. Bucket capacities range from 10 to 27 cu ft, and attachments for specialized handling requirements are available. The



machine is 117 in. long with bucket in tip-back position and has a turning radius of 6 ft 7 in. It is powered by a six-cylinder, 66-hp engine available for operation with gasoline or LP gas.—**Yale & Towne Mfg. Co., Yale Materials Handling Division,** 11000 Roosevelt Blvd., Philadelphia 15, Pa.

For More Details Circle No. 388—Page 285

ELECTRIC HOISTS*

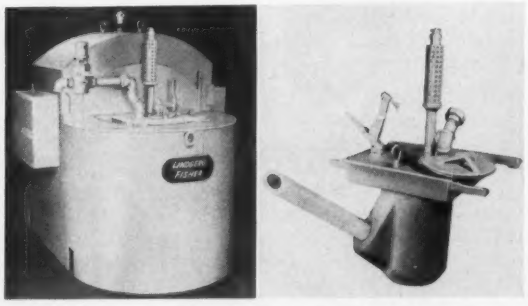
Balanced design to prevent undue tipping at either extreme point of lift is a basic feature of a redesigned line of electric hoists. They are available in lug suspension, plain trolley, geared trolley, and motor-driven trolley types. Capacities range from 500 to 4000 lb, and all are equipped with a new solenoid motor brake. Motors are rated at ¼ to 1½ hp for operation on 115/230 v, single-phase or 220/440 v, three-phase power. Grooved cable drums of the hoists accommodate 25 or 82-ft lengths of cable without overlapping.—**Wright Hoist Division, American Chain & Cable Co.,** York, Pa.

For More Details Circle No. 389—Page 285

Melting and Pouring

FURNACE and LADLING UNIT*

Electric resistance melting and holding furnace has a holding capacity of about 2000 lb of aluminum. Unit is furnished with panels, thermocouples, tap



transformer, signal lamp, and contactor for high-low control. Other models are available in 500 and 1500-lb holding capacities. Heating elements are mounted in the removable furnace top. When it is removed, the entire bath is exposed. Heater elements may be replaced without shutting down the furnace. Automatic temperature control is provided by a pyrometer connected to a thermocouple in the well adjacent to the automatic pumping unit. A millivolt pyrometer connected to the thermocouple in the heating chamber limits temperature in chamber above the metal surface.

The automatic ladling unit at right makes possible automatic processing of permanent mold and diecastings. The unit essentially is a pressurized chamber, the size of shot depending on pressure and time of pressure application. The basic pump has no moving parts, check valves, or other devices. Ladled metal is withdrawn from beneath the bath surface. There is no interruption of the casting cycle during

charging of metal. Interlock circuits prevent metal pumping during indexing or opening of the die. The pump supplies 1 to 30 lb of aluminum; different capacities in aluminum or other metals are available.—**Lindberg Engineering Co.**, 2450 West Hubbard St., Chicago 12, Ill.

For More Details Circle No. 390—Page 285

SEALED PRESSURE LADLES

Sealed pressure ladles used with hydraulically-operated inoculation stations were developed and built for production of ductile iron. Use of the ladles is said to provide better metallurgical control over the process; effectively control objectionable

fire, flash, and smoke, and to reduce magnesium loss. Pure magnesium may be used as the inoculant, it is claimed. The engineered and field-tested ladles are available in four sizes. Package units are standard, modified units available to meet specific problems.—**Industrial Equipment Co.**, 115 Ohio St., Minster, Ohio.

For More Details Circle No. 391—Page 285

ALUMINUM HOLDING FURNACE*

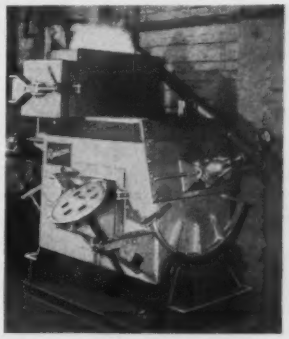
Electric resistance holding furnace is for use in diecasting and permanent mold foundries. It is available in four holding capacity sizes of 500 to 2000 lb. Resistance elements are situated in a removable roof

and may be replaced while furnace is in operation. Power is supplied from a multiple-tap transformer with a wide range of output to facilitate close control over metal temperature. Features claimed are a quiet bath, low dross formation, low heat input, and ability to hold metal for long periods with no overheating. If a charge freezes because of power failure, it can be melted without damage to the furnace in less than 24 hr, it is claimed.—**Stroman Furnace & Engineering Co.**, 9900 Franklin Ave., Franklin Park, Ill.

For More Details Circle No. 392—Page 285

MELTING FURNACES*

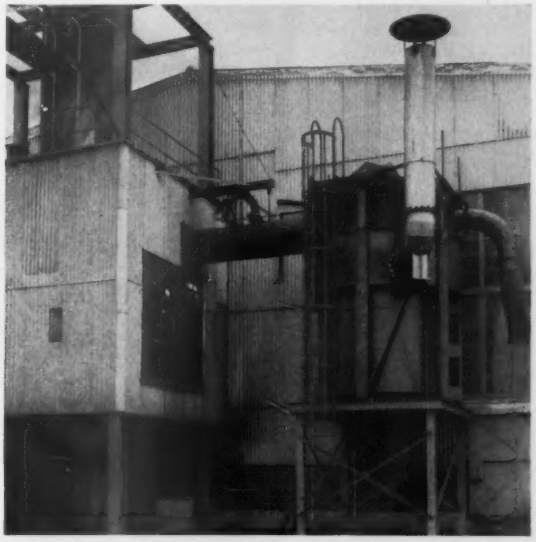
Furnaces with melting capacities of 50 lb to 5 tons are available in oil, gas, or coke-fired models. They are designed to melt metal fast with a minimum of fuel. The manufacturer claims that when melting ingot in these furnaces, metal loss is held below 1 per cent for aluminum and 2 per cent for bronze. Stated melting rates and fuel consumption are 100 lb of aluminum in 10 minutes with 0.7 gal oil; 200 lb brass in 20 minutes with 1.1 gal oil, and 100 lb iron in 45 minutes with 2 gal oil.—**International Foundry Supply Co.**, Box 1053, Reading, Pa.



For More Details Circle No. 393—Page 285

CUPOLA AIR PREHEATERS*

Line of all-metal, hot-blast preheaters for foundries employs finned combustion tubes said to provide eight to ten times the surface area of plain tubes. Much heat can be transferred per square foot at comparatively low wall temperatures, so heaters can be of relatively small size for a given capacity. Burners in the heaters are controlled automatically, operate with gas, oil, or a combination, and are equipped with a combustion air blower. Any number of heaters can be interconnected in parallel to produce the

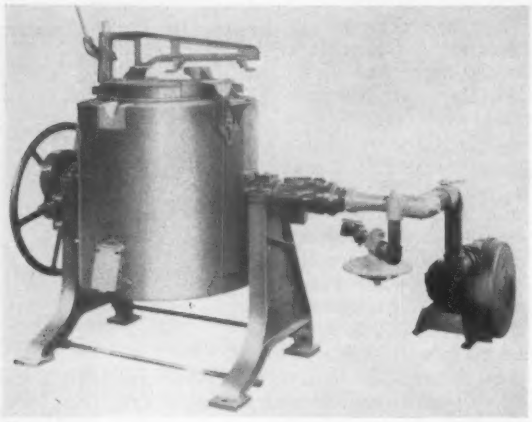


desired hot air volume. The heaters are packaged units with heat exchanger, burners, controls, safety devices, interlocks, and instrumentation ready for installation.—**Brown Thermal Development Co.**, subsidiary of **Brown Fintube Co.**, Elyria, Ohio.

For More Details Circle No. 394—Page 285

CRUCIBLE FURNACES*

Tilting and stationary crucible furnaces for melting nonferrous metals are interchangeable for gas or oil fuel and are assembled and test-fired to operating temperature before shipping. Cover-ventilating

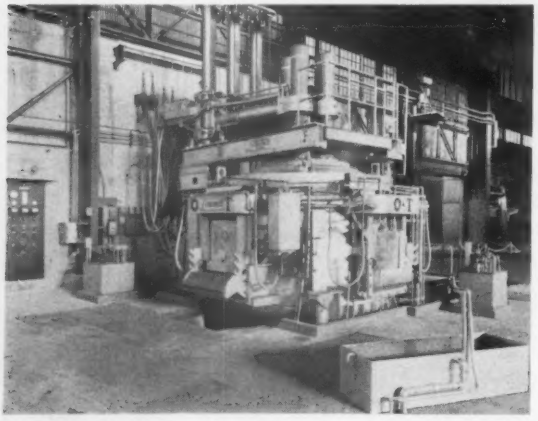


top construction, according to the manufacturer, assures easy access to the entire bath and accommodates the latest bowl-type crucibles. Tilting units incorporate a swing-top design which compensates for top covers of various thicknesses and diameters.—**Campbell-Hausfeld Co.**, 6001 Moore St., Harrison, Ohio.

For More Details Circle No. 395—Page 285

ELECTRIC FURNACES*

Improved features of the company's electric furnaces include extra deep shells to permit large charges of lightweight scrap; roof rings larger in diameter than the furnace shell to give long life; four-point suspension of roof rings for quick and proper alignment and to permit quick interchange of rings; power-operated electrode holders with inserts to give long wear; cone-drive winches to give



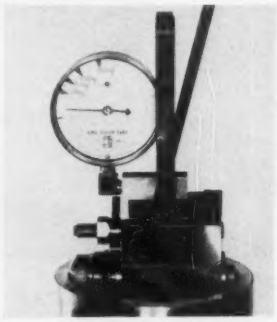
rapid movement of electrode arms; and a separately mounted, hydraulically operated mechanism for raising and rotating the roof for top charging. Furnaces are offered in capacities from 250 lb to 200 tons. The one illustrated shows typical construction for furnaces of about 10 to 20 tons capacity.—**Lectromelt Furnace Div., McGraw-Edison Co.**, Box 1257, Pittsburgh 30, Pa.

For More Details Circle No. 396—Page 285

Cleaning and Inspection

INTERIOR BRINELL TESTER*

Brinell hardness tester is designed to make hardness tests on interior walls of castings such as cylinders and similar shapes. The portable tester uses a 5-mm or 10-mm carbide ball with loads ranging from 500 kg to 1500 kg. The instrument can be furnished for openings with a minimum diameter of 6 in. and can take tests at a depth of 10 or more inches. For large pipe, extensions can be furnished to

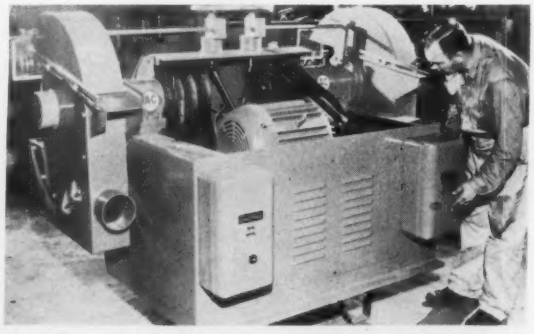


hold test head in position, and tests can be made at any point on the inside walls.—**King Tester Corp.**, 440 N. 13th St., Philadelphia 23, Pa.

For More Details Circle No. 397—Page 285

SNAGGING GRINDERS*

New design of the drive for variable speed snagging grinders is intended to provide the greatest amount of power when most needed. The adjustable



pulley on the grinder is placed on the driven shaft rather than on the motor shaft. This arrangement gives the maximum amount of belt contact when the grinding wheel is at its largest diameter. The drive is provided on grinders ranging from 7½ to 40 hp. Another new development is a hydraulically operated snagging grinder having automatic adjustment for wheel wear.—**United States Electrical Tool Co.**, 3640 Llewellyn St., Cincinnati 23, Ohio.

For More Details Circle No. 398—Page 285

RADIOGRAPHIC DEVICES*

The cobalt 60 radiographic unit at left is designed for inspection of steel products up to 10 in. thick with 1 and 2 per cent radiographic sensitivity. In 15 minutes it will radiograph 6-in.-thick steel; thinner sections take less time. The radioactive source

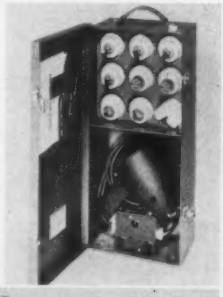
container is mounted to the beam and can be aimed in any direction. The unit is remote controlled.

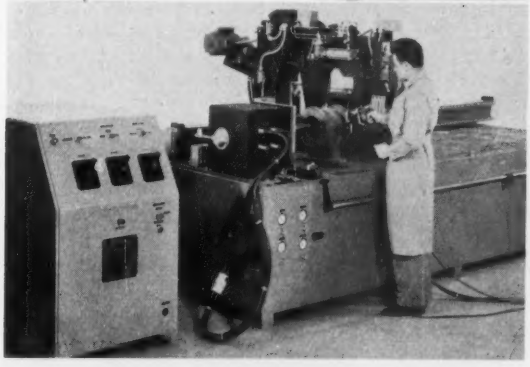
The portable warning device at right will flash lights, ring bells, and lock doors leading to working area if radiation from an emitting device exceeds a preset level, even as low as three milliroentgens an hour. About the size of a lunchbox, the unit weighs 12 lb and operates on 115v ac.—**Picker X-Ray Corp.**, 25 S. Broadway, White Plains, N. Y.

For More Details Circle No. 399—Page 285

INSPECTION EQUIPMENT*

Portable fluorescent penetrant inspection kit contains all materials and equipment for detecting cracks, pores, leaks, and other surface defects in any solid material. The kit contains cleaner, penetrant, and developer in pressurized spray cans; a high intensity black light source; cleaning cloths; wire brush, and instructions. The larger machine is designed for nondestructive testing a variety of shapes and sizes of castings



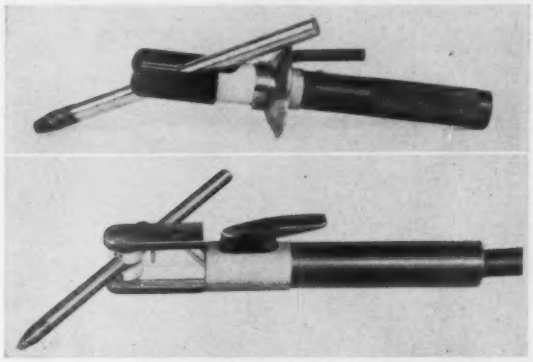


by the magnetic particle method. It is a general-purpose unit for high-speed testing. Features include auxiliary magnetizing equipment such as a split-coil, clamps, and prods to permit on-the-floor inspection of castings too large for the unit; turntable facilities for handling castings, and up to 8000 amp, full-wave, direct current for magnetizing.—**Magnaflux Corp.**, 7300 W. Lawrence Ave., Chicago 31.

For More Details Circle No. 400—Page 285

METAL REMOVAL TORCHES*

The M-6 model torch at top is designed for heavy duty foundry applications such as pad washing. It has a fixed electrode angle, capable of withstanding high currents and having good electrode contact area. The model at bottom is a heavy-duty, double-headed unit for operations requiring air on both sides of or completely surrounding the electrode. The company also recently introduced copperclad elec-

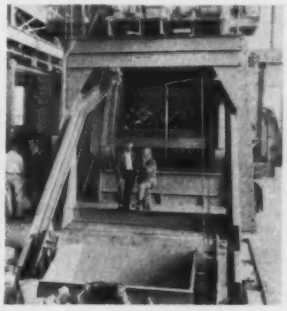


trodes for use with alternating current welding machines on cast iron, copper alloys, and high-nickel alloys.—**Arcair Co.**, Box 431, Lancaster, Ohio.

For More Details Circle No. 401—Page 285

BLAST CLEANING BARRELS*

The model 72 GN blast barrel shown here is one of four heavy duty units in a line of machines which offers a range of 1½ to 102 GN sizes and types. The machines feature heavy duty construction, varying wheel sizes, vane widths, horsepowers, and additional operating and maintenance features. Some of the smaller sizes offer rubber belt conveyors for the work pieces; larger sizes are equipped with rugged cast steel slat conveyors. Various models offer one or two airless blast units, depending on type and use. Automation also is available to suit the special needs of individual foundries.—**Pangborn Corp.**, Box 380, Hagerstown, Md.



For More Details Circle No. 402—Page 285

RADIOGRAPHY MACHINES

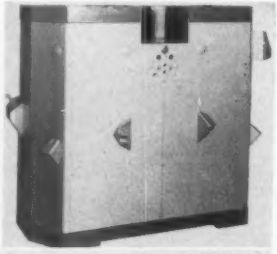
The isotope radiography machine at top, containing 30 curies of iridium 192, is designed for internal exposures where the source is exposed within a cavity of the casting with film wrapped around the outside, also for panoramic shots where castings are arranged around the source and radiographed simultaneously. It may be used for ¼ to 3-in.-thick steel. The 40-lb unit is remotely controlled from distances up to 50 or more feet. The unit stores its own source and the shielded head

serves as a shipping container. The machine at bottom has a capacity of 1000 curies of cobalt 60 and will radiograph from 1 to 12 in. of steel. It may be obtained with extra source positions to accommodate a smaller cobalt 60 source, or other sources such as iridium 192. It has fail-safe automatic controls and is operated from a remotely located console.—**Nuclear Systems**, a division of **Budd Co.**, Philadelphia 32, Pa.

For More Details Circle No. 403—Page 285

ELEMENT DETERMINERS*

The unit at top right provides direct-reading, spectrochemical x-ray fluorescence analysis for simultaneous determination of up to 22 elements. A sample can be analyzed completely, it is said, in less than 2 minutes. The instrument is adaptable for the detection of elements above atomic number 12, including Mg, Al, Si, P, S, Cl, K, and Ca. Accurate quantitative analysis of each element in the sample is claimed. The instrument shown at bottom is designed for direct-reading spectrochemical analysis of C, P, and S simultaneously with Si, Mn, and the other metallics in steel and cast iron. Results are said to be obtained in less than 2 minutes, and as many as 23 elements can be analyzed simultaneously. The instrument provides permanent, inked records showing concentrations of all elements.—**Applied Research Laboratories**, Box 1710, Glendale 5, Calif.

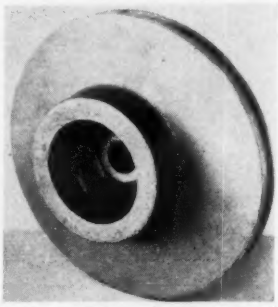


For More Details Circle No. 404—Page 285

Foundry Supplies

HIGH STRENGTH ALLOYS*

Ni-Resist ductile austenitic irons are a group of nickel-alloyed cast irons containing 18 to 30 per cent nickel, which are treated with magnesium to achieve spheroidal graphite. They are said to have tensile strengths of 55,000 to 80,000 psi, elongations of 4 to 40 per cent, resistance to frictional wear, corrosion, erosion, and heat and good machinability and castability. These high nickel alloyed ductile irons may be made in several types with different alloy content to obtain the desired combination of properties. Shown here is a pump impeller made of one type of the material.

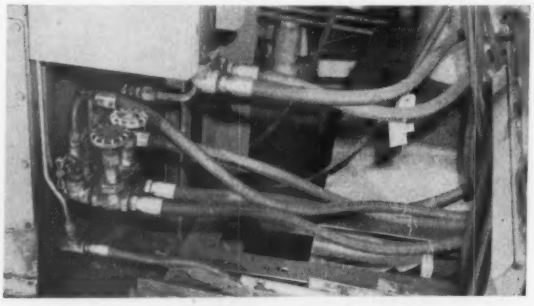


The company also has developed Ni-Bral, an alloy with 90,000 to 100,000 psi tensile strength, elongation of 18 per cent in 2 in., and an as-cast hardness of 180 brinell. The material is said to have good resistance to corrosion, erosion, cavitation, and heat up to 700° F.—**International Nickel Co.**, 67 Wall St., New York 5, N. Y.

For More Details Circle No. 405—Page 285

INDUSTRIAL HOSE

The medium-pressure hose shown here operates under 800 to 1000 psi and serves as supply and return lines for the hydraulic system on a sand-slinger. Medium and high-pressure hose of this type also is used on diecasting equipment. This hose is said to resist abrasion and to withstand constant use under high pressure. Fittings are detachable and reusable, facilitating the making of hose assemblies of any desired length. The company also makes Teflon hose with such fittings. Hose and



fittings are engineered for use where unusual exposure to wide temperature ranges, − 100° F to + 500° F, and injurious chemical action are encountered.—**Aeroquip Corp.**, 300 South East Ave., Jackson, Mich.

For More Details Circle No. 406—Page 285

STEEL ABRASIVE SHOT*

Steel blast cleaning shot is said to have a narrow hardness range and a high degree of uniformity, density, and toughness. Made of high-quality electric furnace alloy steel, the abrasive is shotted by a vacuum cast method said to provide good density and reduce voids and defects. It is heat treated in a controlled atmosphere, resulting in nearly scale-free shot of uniform quality and narrow hardness range. An inspection and testing program designed to maintain metallurgical and chemical properties includes microphotography, Rockwell hardness tests, impact tests, flotation tests, shot breakdown tests, time endurance tests, and field tests in various types of blast cleaning machines.—**Pangborn Corp.**, Box 380, Hagerstown, Md.

For More Details Circle No. 407—Page 285

BRASS and BRONZE INGOT*

Brass and bronze ingot is said to have rigidly controlled properties made possible by a new production process employing bottom pouring in a controlled atmosphere of dry nitrogen. Oxidation and hydrogen pickup from the atmosphere is said to be reduced. Ingots are made in a new size and shape to facilitate piling and storing and reduce accidents. Uniformity of weight also is claimed for the ingots. —**I. Schumann & Co.**, Box 2219, Cleveland 9, Ohio.

For More Details Circle No. 408—Page 285

REFRACTORY RAMMING MIXES

High-alumina ramming mix with high temperature resistance was formulated for severe applications. It has been used for lining ladles handling acid electric steels, to ram electric furnace roofs around electrode openings, and in other places as a substitute for specially-shaped high-alumina brick. The company also offers a black plastic refractory which is said to combine high refractory quality with good workability for easy ramming. The material is not wetted by slag or metal and may be used for lining ladles, forming tapholes and slagholes, and lining forehearths and cupola spouts. —**Ironton Fire Brick Co.**, Ironton, Ohio.

For More Details Circle No. 409—Page 285

DEGASSER for ALUMINUM*

Solid degasser is made in the form of a tablet with a central hole into which a plunger rod may be threaded for plunging the tablet into the melt. Tablets are available in 3 and 6-oz sizes for degassing melts of 50 and 100 lb, respectively. Up to three 6-oz tablets can be used at one time for degassing up to 300 lb of aluminum alloy. Decomposition rate of the tablets is controlled to permit formation of small bubbles evolved over a period of time.

The company has improved its moldable exothermic compounds. Dry strength has been increased to facilitate handling the shapes, and moisture resistance has been improved to increase storage life.—**Foundry Services Inc.**, 2000 Bruck St., Columbus 7, Ohio.

For More Details Circle No. 410—Page 285

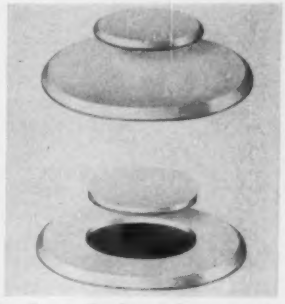
LIQUID PHENOLIC RESINS*

Two liquid phenolic resins, developed to meet faster production techniques in foundries, are available for cold coating sand used for making contour shell molds and shell cores. Resin LC-109 is intended for use in molds and cores which require medium curing speed, good warp resistance, and good dimensional stability. The material is said to impart high strength characteristics with excellent shakeout properties. Resin LC-200 is designed for use in high-speed automatic mixing equipment. Advantages claimed are low viscosity, fast curing, high dry strength, and good solvent release properties.—**Archer-Daniels-Midland Co., Federal Foundry Supply Div.**, 2191 W. 110th St., Cleveland 2, Ohio.

For More Details Circle No. 411—Page 285

BLAST BARREL END LINERS

Rubber-covered end liners for tumble blast machines are said to resist the wearing force of shot and to reduce shot breakage. The liners are available in two forms. The one shown at top consists of a center patch disc superimposed on a solid main disc. Both are made of 7-gage steel covered with 70 durometer Type K rubber. The one at bottom consists of a hollow center main disc and a center patch disc. Both styles permit worn-out center portions to be replaced without installing a complete, new end liner. Experience shows, according to the company, that greatest wear occurs at the center. Both sections of both styles are fastened to the machine by inserting a bolt from outside the structure into a tapped hole in the steel back of the liner or by welding a bolt to the back of the liner and applying a nut on the outside of the machine.—**Gates Rubber Co.**, 999 South Broadway, Denver 17, Colo.



For More Details Circle No. 412—Page 285

PLASTIC FIREBRICK*

Two types of plastic firebrick which are not wetted by molten iron have been developed for use in furnaces, forehearths, and ladles. One, a super-duty brick with added graphite, has a high degree of refractoriness and is said not to vitrify even with the hottest molten iron. It may be hand or air-rammed to any desired shape. The other

is a high alumina brick with added graphite. It also has a high degree of refractoriness. According to the manufacturer, the brick is not readily attacked by acid or basic slags.—**Harbison-Walker Refractories Co.**, 307 Fifth Ave., Pittsburgh 22, Pa.

For More Details Circle No. 413—Page 285

FRICTION SAWING BLADE

Friction sawing blade is said to cut fast and have long wearing qualities. The blade features an efficient tooth and gullet design. A special heat treating process permanently anchors the teeth to the band and preserves the set under severe conditions encountered in foundry cut-off operations. Metallurgical characteristics are said to permit maximum flexibility of the band, resulting in long blade life and good resistance to abrasion at high friction sawing velocities. The blades are offered in ½, ¾, and 1-in. widths.—**DoAll Co.**, 254 N. Laurel Ave., Des Plaines, Ill.

For More Details Circle No. 414—Page 285

CUPOLA and LADLE FLUXES

Two recently developed fluxes include a briquetted cupola type with added fluxing power designed for foundrymen using basic lined or water-jacketed cupolas and for others requiring greater than usual amounts of flux. A granular flux is designed to reduce ladle slag problems sometimes encountered in producing nodular iron.—**Superflux Mfg. Co.**, 16125 Cleophus Parkway, Allen Park 10, Mich.

For More Details Circle No. 415—Page 285

CUT-OFF WHEEL

Abrasive cut-off wheel, BZ2AA, is said to average 33 per cent more cuts per wheel than its predecessor, BZ2. The increased life primarily is due to a new resinoid bond that closely matches the wearing and fracturing behavior of the abrasive grain. A spiral pattern on the side of the wheel produces a much freer cut. This is claimed to be a contributing factor to the wheel's longer life. The new cut-off wheel is reinforced for extra strength and safety and may be used on all types of cut-off machines.—**Bay State Abrasive Products Co.**, Westboro, Mass.

For More Details Circle No. 416—Page 285

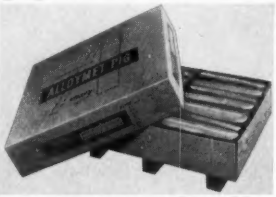
METAL ABRASIVE

A recently developed metal abrasive is said to have performance characteristics which compare favorably with those of regular steel shot. The abrasive is manufactured as shot and grit to SAE specifications and is available in 50 and 100-lb bags. Free laboratory tests are offered if at least 200 grams of sample are sent to the company for comparative testing, or, samples of the new abrasive will be sent to foundrymen who wish to make their own tests.—**Metal Blast Inc.**, 872 E. 67th St., Cleveland 3, Ohio.

For More Details Circle No. 417—Page 285

NICKEL ALLOY*

Nickel alloy ingots are packaged in fiberboard pallet boxes ready for charging into the furnace, box and all. If smaller quantities are required, ingots may be removed from the box. Certified analysis, heat identification, and weight of each ingot are shown on the outside of each box. Boxes measure approximately 29 x 39 x 8½ in. and hold 22 to 30 ingots weighing about 50 lb each.

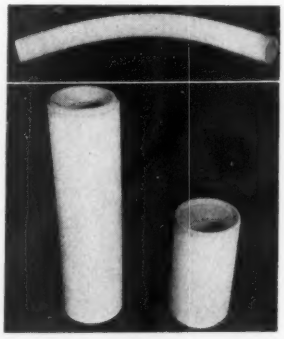


The company also has developed a line of inoculants for producing spheroidal graphite in iron. The inoculants include nickel-magnesium, copper-magnesium, and iron-magnesium with or without either silicon or cerium. Special combinations of these elements can be formulated to suit requirements.—**Alloy Metal Products Inc.**, Rockingham Rd., Davenport, Iowa.

For More Details Circle No. 418—Page 285

REFRACTORY GATING

Two gating components have been added to the company's line of refractory products. The bent tube shown at top is available in various radiuses. Such tubes have replaced sand horn gates successfully and have been used in the bottom pouring of manganese bronze propeller castings. Matching end runner tile are shown at bottom. They supplement plain end tile which has been available for many years. Inside diameters from 1½ to 3 in. and lengths from 3 to 12 in. in ½-in. increments can be furnished. Wall thickness is ⅜-in.—**Universal Clay Products Co.**, 1515 E. First St., Sandusky, Ohio.



For More Details Circle No. 419—Page 285

CORE BINDERS

Water-soluble, aminoaldehyde thermosetting resin binder was developed for cores for use in making copper, brass, bronze, aluminum, magnesium, and iron castings. It is said to have little objectionable odor, to produce cores with good collapsibility, and to have a storage life of four months at 75 to 80° F.

A viscous, core-oil type, self-curing binder also

has been developed for making complicated cores. The material serves as the sole binder with dry sand and is said to produce dense, hard cores with low potential gas evolution. The binder and a nontoxic, nonstaining accelerator are mixed with clean, dry sand and the cores made. Following a short curing time, the cores are stripped from the box and baked for periods said to be 20 to 50 per cent of the time required for conventional core oils.—**Reichhold Chemicals Inc.**, RCI Building, White Plains, N. Y.

For More Details Circle No. 420—Page 285

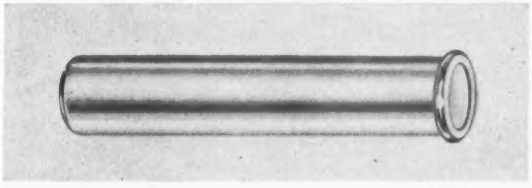
SHELL BONDING RESIN*

Liquid bonding resin for shell molds may be applied to parting surfaces with a squeeze bulb. The material is slow to cure until the cope is placed in position. This slow initial cure is said to result in a tight parting line with less finning in the finished casting.—**Acme Resin Corp.**, 1401 Circle Ave., Forest Park, Ill.

For More Details Circle No. 421—Page 285

LITHIUM PURIFYING AGENT*

Lithium, for use as a deoxidizer, degasifier, desulfurizer, and general purifying agent for copper or copper-base alloys, is offered in an improved cart-

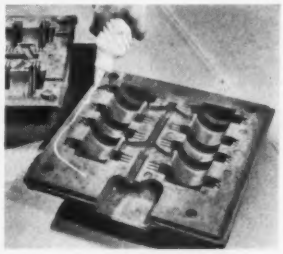


ridge containing 2.25, 4.50, or 9.0 grams in rod form. A 108.0-gram charge is offered in cup form. Copper content of the thin-walled cartridges assays in excess of 99.9 per cent, it is claimed. The 4.50-gram charge is intended to refine 200-lb melts. Cartridges are introduced into the lower part of the crucible by a suitable holder. The product will be exhibited at the show by Niagara Falls Smelting & Refining Division, Buffalo, and SiPi Metals Corp., Chicago.—**Lithium Corp. of America Inc.**, 2600 Rand Tower, Minneapolis 2, Minn.

For More Details Circle No. 422—Page 285

CORE PASTE and CO_2 BINDER*

The company has improved its core paste to reduce drying time 10 per cent and to increase flowability. Also, less of the new paste is required to do a comparable job. The paste is intended for use on CO_2 cores, shell molds, resin-bonded cores, and oil-sand cores. A new CO_2 binder also is being offered. It is said to have no tendency to be viscous or gummy; to react quickly with CO_2 when cores are gassed, and to produce cores with good collapsibility, compression strength, scratch hardness, shelf life, and minimum sand grain shedding. According to the company, the sand-binder mixture has good flowability, is easy to handle, and produces cores or molds with maximum density by ramming or blowing.—**Frederic B. Stevens Inc.**, 1800 18th St., Detroit 16, Mich.



For More Details Circle No. 423—Page 285

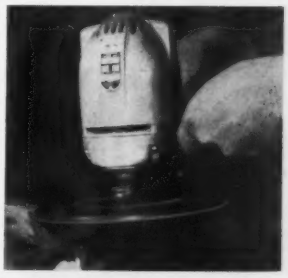
SAND COATING RESINS*

Resins for coating sand by various processes include powdered and liquid types for cold coating and ground resins for hot coating. Certain advantages are claimed for use of resin-coated sands in shell molding and coremaking processes: Dust is reduced in the dump-box production of molds, and lower material cost is possible due to lower resin content required for a given tensile strength. Separation of sand and resin is eliminated when molds and cores are produced by blowing.—**Durez Plastics Div., Hooker Electrochemical Co.**, 1004 Walck Rd., North Tonawanda, N. Y.

For More Details Circle No. 424—Page 285

ABRASIVE DISCS

Mushroom-shaped, molded rubber pads and coated abrasive discs are designed for use on portable pneumatic or electric tools for grinding or polishing in small radii or difficult contours. The pads and discs currently are available in diameters of 5 and 8 in. The rubber pads in both diameters are made of proper density for polishing; a third mushroom-shaped pad in 5-in. diam is made of a harder density for stock removal. The discs are cloth-backed aluminum oxide abrasive with an all-resin bond. No center nut is required to fasten discs to pads. Instead, they are fastened by a special adhesive packaged in tube applicators.—**Behr-Manning Co.**, a division of **Norton Co.**, Troy, N. Y.



For More Details Circle No. 425—Page 285

COLD-SETTING BINDER*

Binder is said to produce accurate cores and molds with good surface finish and dimensional stability. After cores or molds have been made they acquire initial strength in the corebox while standing in the air. Then they are stripped and baked for a comparatively short time. The company offers engineering help to adapt use of the binder and process to a foundry's individual method of operation.

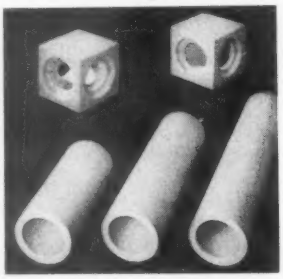
The company also offers a zircon core and mold wash said to withstand metal temperatures in excess

of 3000° F. Supplied in powder form, the material is mixed with water prior to use. It may be swabbed, sprayed, or brushed and is said to anchor deeply into the mold or core surface and to flatten out after application to provide a smooth, even coating.—**G. E. Smith Inc.**, 246 Washington Rd., Pittsburgh 16, Pa.

For More Details Circle No. 426—Page 285

GATE TILES

A line of gate tiles with matching tees and elbows has been developed to withstand temperatures involved in pouring steel castings. Made with hard, dense surfaces, the products have proved effective in preventing erosion of gates in production tests carried on over the past year. The tiles are available in sizes ranging from ¾ to 3½ in. ID and in all popular lengths. Tees and elbows can be furnished out of stock to fit tile from 1½ to 3 in. ID. Other sizes can be made to order.—**Louthan Mfg. Co.**, East Liverpool, Ohio.



For More Details Circle No. 427—Page 285

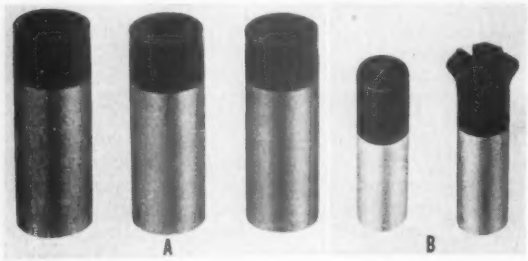
RESIN BINDER*

Designed for producing dry sand molds and cores, this resin binder is said to work best for large and medium work and for skin-dried work. Sand-resin mixes are baked at 400 to 700° F. Advantages claimed for the binder are that it facilitates shakeout because it burns out while metal is cooling, it permits full benefit of blacking penetration because it does not waterproof sand, comparatively small quantities are needed, and blending with other compounds to achieve desired results is unnecessary.—**Whitehead Brothers Co.**, 324 W. 23rd St., New York 11, N. Y.

For More Details Circle No. 428—Page 285

COREBOX BLOW TUBES*

The three specially-shaped orifice tubes shown in Photo A are: 1. Flattened-round form which directs sand stream away from areas in the corebox such as bosses, loose pieces, or deep cavities. It also is useful for blowing at edges of a cavity, thus



reducing erosion of box edge. 2. Slot form used for blowing through narrow openings. 3. Pie-cut form, useful for corner blowing. The valve tip sand arrester tube in Photo B is designed for blowing free-flowing coated sand into hot coreboxes. The tip opens during the blow and closes when the blow cycle ends.—**Martin Engineering Co.**, Neponset, Ill.

For More Details Circle No. 429—Page 285

SILICATE BINDERS*

The company has developed four silicate binders for use with the CO_2 Process. Number 299XX, said to have excellent collapsibility, is intended for use in producing thin-section malleable iron, copper-base alloy, and other nonferrous castings. Binder 285XX with good collapsibility is for use in making gray iron, steel, and heavier section copper-base alloy castings. A fair collapsibility binder, 270XX, is used with gray iron, steel, and all nonferrous metals. In cases where a very high tensile strength is required and collapsibility is relatively unimportant, binder 292XX is recommended.

A semivolatile, liquid parting compound also has been developed for use on patterns and coreboxes. In addition to its sand release properties, it is said to protect pattern and corebox surfaces from abrasion and corrosion and to act as a cleaner.—**Delta Oil Products Corp.**, Milwaukee 9, Wis.

For More Details Circle No. 430—Page 285

METALLIC ABRASIVE*

New line of metallic abrasives includes a controlled analysis chilled iron known as "A" Iron shot and grit and a pearlitic malleable iron shot and grit. These products are said to have increased life due to close control of chemical analysis and microstructure. The "A" Iron is claimed to have 20 to 25 per cent longer life than standard chilled iron; pearlitic malleable has the same percentage increased life of standard malleable shot and grit. Both products are supplements to the company's regular line of abrasives.—**Cleveland Metal Abrasive Co.**, 888 E. 67th St., Cleveland 8, Ohio.

For More Details Circle No. 431—Page 285

FAST X-RAY FILM*

Industrial x-ray film, type KK, is said to be much faster than the company's type K film which it replaces. The new film is expected to prove particularly valuable in reducing exposure time in radiographic inspection of thick sections such as encountered in marine propellers and large steel castings. Despite the film's increased speed, tests indicate that in examination for gross defects its radiographic sensitivity compares favorably with the previous film.—**Eastman Kodak Co.**, X-ray Div., Rochester 4, N. Y.

For More Details Circle No. 432—Page 285

PATTERN COMPOUND*

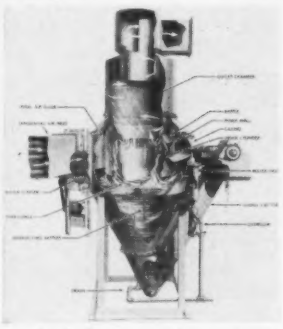
Pattern compound developed for use in floor and machine pattern plates or loose patterns is said to withstand continuous jolting. Supplied in powder form, the material is mixed with cold water to make patterns for average molding requirements. Where high resistance to repeated shock on jolt squeeze and straight jolt machines is needed, a liquid additive supplied by the company is used in mixing.—**International Foundry Supply Co.**, Box 1053, Reading, Pa.

For More Details Circle No. 433—Page 285

General Equipment

WET DUST COLLECTOR*

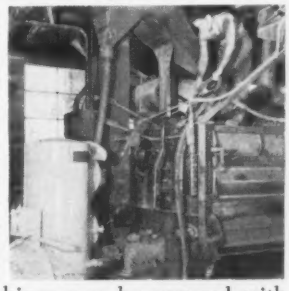
Wet dust collector is available in 12 sizes with overlapping capacities ranging from 1080 to 33,700 cfm. The standard unit has an automatic sludge ejector; collectors are available without the ejector. Dust-laden air enters the collector tangentially and is wetted by a water slinger. It descends spirally to impinge on water in the settling tank and create turbulence on the water surface which aids in thorough wetting of dust particles. Air then spirals up a narrow space between the inner wall of the collector and the inner cylinder. It impinges on an inverted v-baffle which removes most of the wetted dust and deflects it to the inner cylinder leading to the tank. Air continues up through the water spray thus formed to an expansion chamber where remaining centrifugal force and reduced velocity separate water from the air.—**Wheelabrator Corp.**, 505 S. Byrkit St., Mishawaka, Ind.



For More Details Circle No. 434—Page 285

PORTABLE VACUUM CLEANERS*

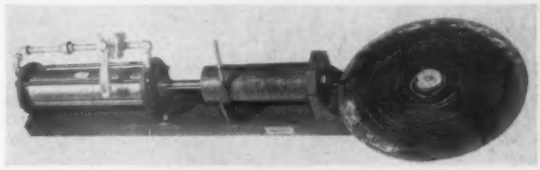
Portable vacuum cleaners are offered in 1½ to 15 hp ratings with dirt container capacities of 1½ to 7½ cu ft. The units, built for heavy-duty industrial service, are equipped with ball bearing swivel casters for easy movement. The dirt can is equipped with casters and is dropped from the vacuum unit by a lever-operated cam. It may be rolled to point of dirt disposal. The machines may be powered with totally enclosed, fan-cooled or explosion-proof motors. Each machine consists of a vacuum producer, a separator, the dirt can, hose, and vacuum tools. Attachments for water pickup and other special applications may be added. The company also will display cupola blowers available in pressures of 4 osi to 10 psi and in capacities to 20,000 cfm.—**Spencer Turbine Co.**, Hartford, Conn.



For More Details Circle No. 435—Page 285

MOLD SEAL EXTRUDER*

Machine, when connected to foundry air line, will extrude cope and drag sealing compound onto a manually-operated circular pallet which can be carried to the job and returned for reloading. Interchangeable dies are available to form the material into any diameter from ¼ to 1 in. The extruding cylinder holds 5 lb of material which will make a sealing strip of ¼-in. material 160 ft long or 42 ft of ½-in. material. Unused extruded material can be put back in a container for re-use. Penn-Rillton Co., 324 W. 23rd St., New York 11, N. Y., will exhibit the machine, which is made by **Stoller Chemical & Foundry Supply Co.**, 8147 Maple Valley Station, Akron 20, Ohio.



For More Details Circle No. 436—Page 285

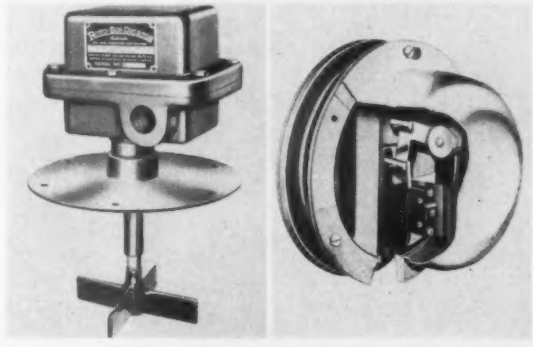
CUPOLA LINING GUN*

Batch type refractory gun is designed for use in foundries melting from 5 to 20 tons a day. It has a capacity of 1400 lb of refractory material. Features claimed are simplicity of operation, low maintenance cost, maneuverability, and the ability to handle refractory materials of extremely high moisture content, such as rebound material. The gun may be used to line cupolas, electric and reverberatory furnaces, and ladles. It is said to produce dense linings in minimum time.—**Blastcrete Service Co.**, 323 East 58th St., Los Angeles 11, Calif.

For More Details Circle No. 437—Page 285

BIN LEVEL INDICATORS

Improvements have been made in the company's material level indicators for bins. The model shown at left is actuated by pressure of material in the bin against a rotating paddle on a flexible shaft to start or stop flow of material to the bin. It has a redesigned low-torque motor and gear reduction unit as well as an improved mounting arrangement. The flexible shaft is a steel spring encased in molded neoprene. Single vane and four vane

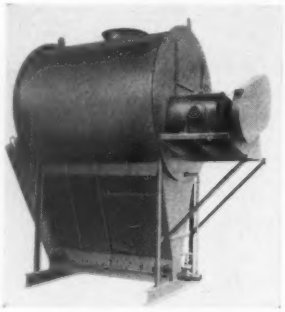


paddles are offered. The unit shown at right controls material flow by action of material in the bin against a flexible diaphragm. It has a twist lock cover which is said to aid installation in hard-to-get-at locations.—**Bin-Dicator Co.**, 13946-U2 Kercheval, Detroit 15, Mich.

For More Details Circle No. 438—Page 285

HOT GAS WASHER

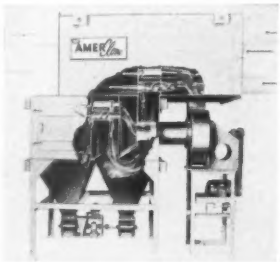
Single-unit hot gas washer is less than 15 ft high and can be used for melting furnaces, incinerators, chemical processes, or other conditions where gases up to 2000° F present an air pollution problem. Hot gases entering the washers are subjected to fine water sprays for cooling and wetting of dust particles, which are impinged centrifugally on the wetted surface of the primary separation chamber and carried to a settling tank in the bottom of the unit. Gases then flow into an induced draft fan chamber with wetted walls against which remaining dust particles are thrown and washed to the tank. Finally, water is separated from the gases in a chamber.—**Lehigh Fan & Blower Division, Fuller Co.**, Catasauqua, Pa.



For More Details Circle No. 439—Page 285

CUPOLA DUST COLLECTOR*

Dry, centrifugal dust collector is designed to handle large exhaust volumes of granular dust such as those found in cupolas or boiler stacks. The system will handle emission from either of two alternating cupolas and will accommodate an additional after-cleaner if smoke and fume elimination is required in the future. Here is how the system operates: Counter-weighted, stainless steel caps are added to the cupola tops. Stack gases are pulled through damper section where initial flash cooling occurs. Regulated cooling continues in a tower with exit temperatures constant, even during melt-down. Cinders, dust, and some metallic fumes are removed and relatively dry gases at 350 to 500° F go out the stack.—**American Air Filter Co.**, 215 Central Ave., Louisville 8, Ky.



For More Details Circle No. 440—Page 285

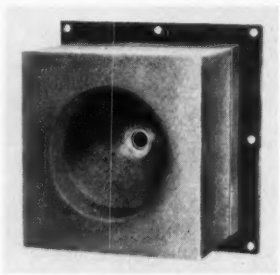
CUPOLA EMISSION CONTROL*

A three-step program utilizing complementary collector equipment has been developed for controlling cupola emissions. Under the plan, collector equipment can be installed to meet existing air pollution codes, and auxiliary equipment can be added should codes become more stringent. The initial equipment usually is a collector which employs a heavy water curtain to remove fly ash. It is designed to remove down to 0.7 lb of contaminants per 1000 lb of gases. With addition of an adaptor in the second step, the removal is down to 0.5 lb per 1000 lb of gases. Third-step addition of a multiwash collector permits removal of contaminants down to 0.3 lb per 1000 lb of gases.—**Claude B. Schneible Co.**, Box 296, Roosevelt Parkway Annex, Detroit 32, Mich.

For More Details Circle No. 441—Page 285

RADIANT GAS BURNER

Radiant cone gas burner features high speed combustion and rapid penetration of the work by radiant heat without flame impingement. With short flame length and low forward velocity of combustion gases, heat can be distributed uniformly and directed in required areas through roofs, walls, or bottoms of furnaces. The unit is designed to burn any commercial fuel gas in stainless steel, concentric mixing nozzles which have large area discharge ports and do not extend into the heat of the radiant cone. Metal surfaces of the burner facing the heat are protected by the cool air and gas flowing over them. The refractory burner block is made of super duty castable material.—**Hauck Mfg. Co.**, 106 Tenth St., Brooklyn 15, N. Y.



For More Details Circle No. 442—Page 285

SPRAY NOZZLES

A new line of spray nozzles designed for installation where space is limited has been developed. The nozzles provide a spray 90 degrees to the inlet pipe and may be installed in the pipe without additional fittings. Identified as the ½-GA series, these nozzles provide a full cone spray pattern with uniform distribution. Other nozzles offer a choice of the standard 65-degree angle type, the wide angle 120-degree type and in-line nozzles. Typical applications include installation in equipment for cooling and washing.—**Spraying Systems Co.**, 3238 Randolph St., Bellwood, Ill.

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COMPRESSED AIR TORCHES

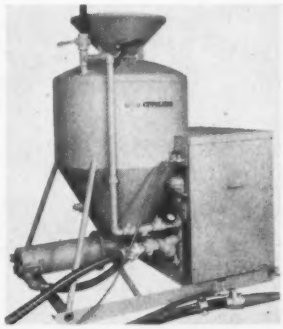
Compressed air torches, offered in five sizes, are designed for drying molds, preheating ladles or crucibles, and lighting cupolas. Each torch is a complete unit consisting of a burner mounted to an inspirator having a special attachment for inducing low-pressure gas and combustion air by a compressed air jet at 40 to 80 psi. Valves at the gas and compressed air connections are included. Flexible hoses are attached to these for portable use

of the torch. The torches use 100 per cent primary air and produce stable flames 1 to 4 ft long, depending on torch size. Capacities in Btu per hour, using 60 psi air, range from 90,000 to 1,670,000.—**North American Mfg. Co.**, 4455 E. 71st St., Cleveland 5, Ohio.

For More Details Circle No. 444—Page 285

REFRACTORY GUN*

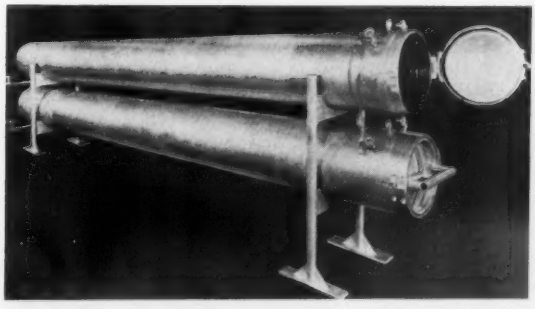
Re-engineered cupola refractory gun has simple controls at the nozzle, enabling the operator to control air supply, moisture, operating pressure, and the rate of material feed through the complete range of 75 to 400 lb a minute. The machine is designed to handle fine, dry castables; heavy basic patching material, and wet rebound material reclaimed from under the cupola. Low air consumption is said to be a feature as is operation on reduced hopper pressure. Almost complete elimination of dust is claimed if the unit is connected to the material storage hopper. The machine has an auger feed that delivers a measured amount of material on each rotation of the auger.—**Eastern Clay Products Dept., International Minerals & Chemical Corp.**, 20 North Wacker Drive, Chicago 6, Ill.



For More Details Circle No. 445—Page 285

DRY ICE CONVERTERS

Dry ice converters are pressure vessels with removable, quick-opening containers, into which dry ice is charged, and which store the resulting liquid and gaseous CO_2 indefinitely under pressure. Doors on the tubular containers permit 50-lb blocks of dry ice to be inserted. The containers also may be charged with liquid CO_2. Dry ice in the containers is said to melt or sublime to a part-liquid, part-vapor state at room temperature in about 12 hr. At that time pressure in the containers will be about 850 psi and will remain there until all liquid has changed to gas. Then, the pressure will decrease as gas is used. Generally converters are used in pairs so that gas may be withdrawn from one while the other is recharged and the dry ice is changing to a gas.—**Dry Ice Converter Corp.**, Box 1652, Tulsa, Okla.



For More Details Circle No. 446—Page 285

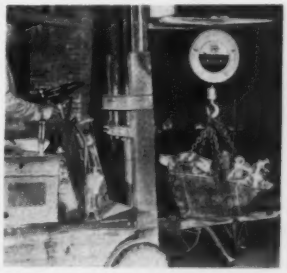
EYE PROTECTION

Lift-front spectacle is designed for eye protection on furnace operations. It features a half-eye lift-front cobalt blue lens hinged to the top of a metal frame spectacle equipped with clear safety lenses. Friction hinge is said to permit repeated raising and lowering without loosening. All lenses can be ground to worker's prescription. The company also offers a foundry goggle for protection in chipping, melting, pouring, grinding, babbitting, and hand tool and machine operations. Goggle has mesh side screens for ventilation and an adjustable rubber headband. Goggle fits over all types of spectacle glasses.—**American Optical Co., Safety Products Div.**, Southbridge, Mass.

For More Details Circle No. 447—Page 285

LOAD SCALE

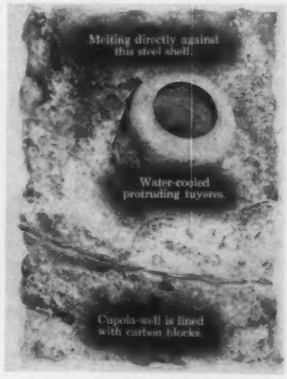
Weighing and handling can be performed in one time-saving operation with a load scale. In addition, its use promotes safety by warning against overloading of hoisting equipment. Features claimed for the unit are that it is accurate to within 0.2 of 1 per cent of the full scale reading, it is sensitive to weight changes of less than half of one division, and it is unaffected by heat or cold within normal temperature ranges. The scale weighs 42 lb, is ruggedly constructed, and is available in 250 to 5000-lb capacities. — **Manning, Maxwell & Moore Inc., Shaw-Box Crane & Hoist Division**, 386 West Broadway, Muskegon, Mich.



For More Details Circle No. 448—Page 285

CAST COPPER TUYERES*

Design of cast copper tuyeres for water-cooled cupolas is said to reduce the tuyere area required in relation to the cross-sectional area of the cupola melting zone. The design creates back pressure in the wind drum, thus equalizing air distribution through individual tuyeres. Reduced area of the tuyere further creates high tuyere-nozzle velocity to deepen penetration and insure good gas-to-solid contact, it is claimed. When installed, the tuyeres protrude into the cupola above the carbon block lined well.—**Modern Equipment Co.**, Port Washington, Wis.



For More Details Circle No. 449—Page 285

Questions and Answers

Silicon content appears too high to provide white iron in section . . . Color determination by eye is not a reliable procedure . . . Change in composition needed . . . Making novelties by slush molding . . . Plagued by shrinkage

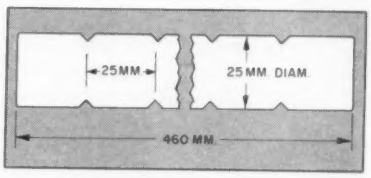
Suggests Decrease in Silicon

We operate a small foundry in India, mainly producing "Cylpebs," a grinding medium employed in the cement industry. They are cast in green sand in the form of notched bars as indicated in the accompanying sketch. Bars are 19, 22, and 25 mm in diameter and 460 mm long, and subsequently are broken at the notches to form small pieces. Composition of the cupola iron poured into the bars shows 1.346 per cent Si, 0.92 per cent Mn, 0.628 per cent P, 0.142 per cent S, 0.752 per cent GC, and 2.816 per cent CC. General complaint of the customers is that the pieces wear out very rapidly and split in service. We are interested in obtaining information on the ideal method suited for the purpose and will appreciate comments on the problem.

Your difficulty with the grinding slugs lies in the fact that the composition of the iron is not correct to provide a white structure in the castings. Although you mention that the iron contains only 0.752 per cent graphite and 2.816 per cent combined carbon, we suspect that the figures are transposed. The composition likely shows 2.816 per cent graphite and 0.752 per cent combined carbon—that is, a pearlitic structure rather than a white structure.

To obtain a white structure in the 25-mm-diam bar the silicon content should be about 0.50 per cent and for the 19-mm-diam bar about 0.65 per cent Si. That opinion is based on an investigation by Schneidewind and McElwee reported in the AFS *Transactions*, Vol. 58, 1950. The authors present equations and curves indicating combinations of carbon and silicon which will result in white structures in given section thicknesses. While not absolute, the methods of calculation are reported to be reasonably accurate.

Possibly because of melting conditions you may be able to secure a white fracture iron with a somewhat higher silicon content than the one mentioned, or perhaps a thoroughly white structure in the castings may have some disadvantage



Notched bar forms grinding medium

which can be ascertained only by field tests. Therefore you will have to do some experimenting to determine the most suitable composition to provide the desired service.

Should Employ a Pyrometer

We operate a gray iron foundry, and would like to obtain a small color chart for use by the pouring crew to tell them when they have the correct pouring temperature. Can you supply any information?

While we are familiar with published tables indicating various colors and approximate temperatures as applied to iron and steel, the only color reproduction depicting the various gradation from faint red to white which we recall is one appearing on page 140 in *Modern Steels and Their Properties*, published by Bethlehem Steel Co.

The book points out that the colors shown are approximately correct only for pieces of steel observed through peepholes in enclosed furnaces, and that the colors are affected by a number of conditions. Also, that it is impossible to register by printed color the brilliance or intensity of color of the metal.

You undoubtedly are aware that judging color depends on the individual and more particularly on the light condition; in a dark area a ladle of iron will appear from its color to be much hotter than when observed in a bright area.

It would be desirable for you to buy a pyrometer, if only to train your pourers in judging temperature by color, and also for occasional checking. Once you have such an instrument, however, it would be inconsistent not to take full advantage of its availability and use it regularly.

Rolls and Gears Wear Rapidly

We will appreciate information on one of our problems on sugarcane crushers which we are manufacturing in India. Major problem is that the rolls and gears of the crushers wear out soon after being placed in continuous use, and we would like to know how longer life might be obtained for those parts.

It is unfortunate that you did not forward any information on the compositions of the irons you are using and the sizes of the rolls and gears. We assume that the rolls are made in sand rather than chills.

Evidently the rolls are too soft to withstand the abrasive action of the crushing operation. They will have to be hardened by reducing the silicon content or by addition of alloying agents. Possibly the reduction of silicon to 0.60 to 0.80 per cent will accomplish the desired results. It also has been indicated that a phosphorus content around 0.50 per cent provides a hard network formation which does not wear as fast as the matrix, and aids in gripping the cane.

A reduction in silicon or addition of alloying agents will produce a similar improvement in the gears. For plain gray iron gears in the light classification, the silicon may be around 2 per cent; for medium type 1.7 per cent, and for heavy gears around 1.2 per cent silicon. Properties of wear resistance and strength of such gears may be enhanced through additions of chromium, nickel, molybdenum, etc.,

singly or in combination as needed.

Further improvement in wear resistance of the gear teeth may be accomplished by flame hardening—a procedure involving rapid heating of the teeth to a temperature 50 to 100° F above the critical or transformation point of the iron by oxyacetylene or other suitable flame, and then quenching immediately in water. Raising the teeth to the desired temperatures also may be accomplished by high frequency induction heating. This hardening method results in a hard surface layer up to $\frac{1}{8}$ in. thick.

Procedures in Slush Molding

We are endeavoring to procure a textbook on the proper method for making slush castings as well as describing construction of the molds, and the low melting point alloys used for the wanted objects. The method is that used by ornament and novelty manufacturers.

So far as we know, there is no book describing the details of slush molding. Briefly, the process employs bronze molds into which the alloy is poured, allowed to remain for a short period to form a thin shell, and then the mold is turned over to permit the remaining liquid alloy to flow back into a holding pot.

Commonly used alloys for slush castings are zinc-base, but lead-base and tin-base alloys sometimes are employed. Two zinc-base alloys include the 5.5 per cent aluminum, remainder zinc, and the 4.75 per cent aluminum, 0.25 per cent copper, remainder zinc types. Both grades have limitations of 0.007 per cent lead, 0.005 per cent each of cadmium and tin, and 0.10 per cent iron. The 5.5 per cent aluminum type alloy is said to provide thinner wall castings.

A lead-base alloy for slush casting contains 13 per cent antimony, 1 per cent tin, 0.5 per cent arsenic, 0.1 per cent copper, and the remainder lead. The tin-base alloy is britannia metal containing 4 to 7 per cent antimony, 1 to 2 per cent copper, and the remainder tin.

Bronze molds usually are made in two or more pieces so that they may be separated for removal of the casting. They are clamped together for filling with the alloy. Molds preferably are produced by the plaster molding process so that smooth surfaces can be obtained without the necessity of machining. Molds often are equipped with trunnions and mounted so that they may be titlted for filling and emptying.

The opening or sprue for filling the mold is situated so that the opening left in the casting after emptying the liquid metal is not visible—such as on the underside—or may be covered by the mounting.

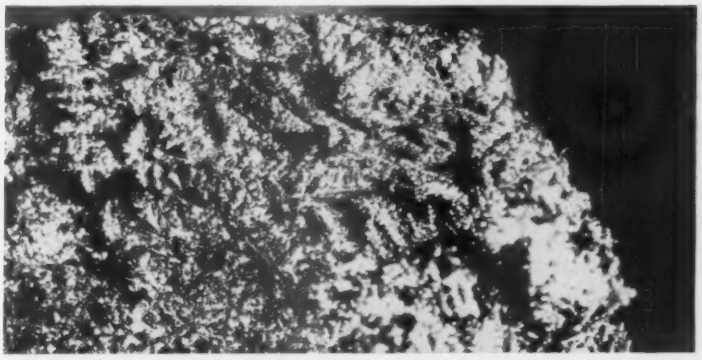
In practice, the operator works on a bench on which the mold is set up. The metal holding pot is alongside, and sometimes a second metal pot is used into which the partially cooled metal from the molds is emptied. Both pots are heated, and use of the second pot permits better temperature control. A tank or container filled with water for cooling the molds also is adjacent to the bench.

Using a small ladle, the operator takes metal from the holding pot and pours it into the clamped mold. After 10 to 20 seconds, depending on the desired shell or casting thickness, he tilts the mold and pours out the remaining liquid metal. The mold is unclamped, the casting removed, and if required the mold parts are dipped into the water tank for cooling. Then the mold is reassembled, clamped together, and again filled with metal.

Heavy Section Shows a Shrink

We are operating a foundry in the Midwest and have been having considerable trouble with a particular casting. A section of the casting showing the defect is being forwarded for examination. We made a number of the castings years ago without trouble.

The casting is a block 10 x 10 x 10 x 10 x 20 in. long, weighing approximately 100 lb, and every one we make shows the defect in the middle of the casting. We have tried different gating and risering without results. We are using a good grade of iron running 2.20 per cent Si, 0.60 to 0.65 per cent Mn, and about 3.20 per cent TC. Our charges are made up of about 20 per cent pig iron, 25 per cent steel and the remainder No. 1 machinery cast.



Feathery dendritic formation in defective area. Enlarged 7½ X approximately

Although there are several points in your inquiry which do not jibe, you can rest assured that the difficulty you are encountering is shrinkage caused by lack of feeding. While you mention that you have tried different gating and risering methods without results, you will have to do some further investigation in that field to eliminate the problem.

We cannot make any suggestions on arrangements to be tried since we have no idea what the casting looks like. Your statement that the casting is a block, 10 x 10 x 10 x 10 x 20 in. long might indicate a solid 10 in. on a side and 20 in. long, but in gray iron that would weigh over

five times the 100-lb weight mentioned. Whatever the casting might be, it is of heavy section, as indicated by the 2 x 2 x ½ in. specimen you sent showing saw cuts on all faces. If the casting is a block or chunk, we suggest you consider the methods described in "Gating for a Chunky Casting" which appeared on Page 97 of the March issue.

It appears to us that the iron you are pouring into the heavy section casting is high in silicon as it results in a coarse, open structure which is quite evident in the fractured section. We believe that a much better structure and physical properties will be obtained with a silicon content not over 1.50 per cent for a 2-in. section. If the section is thicker, the silicon content can be reduced further.

Producing Converter Steel

For many years we have read with considerable interest the Question and Answer department of FOUNDRY. We will appreciate any references to articles in past issues which describe the procedure in making small steel heats, 1000 to 1500 lb, in the side-blown converter.

Like any melting process, the production of steel in the converter requires some skill and experience to obtain consistent results. Some descriptive information on converter practice is given in Hall's book, *Steel Foundry Practice*.

As might be expected, it is difficult to describe in words, many of the conditions or phases of operation since they depend on actual observation. Fortunately, one of the important steps which formerly depended on the eyesight and judgment of the operator—that of ascertaining the end of the blow by the drop in the carbon flame—now is determined exactly by an electronic eye designed for the purpose.

Briefly the making of converter steel includes selection of raw materials for the cupola charge which are as low as possible in phosphorus since that element cannot be reduced in the process. Rather, there is a slight increase in percentage through oxidation losses in other elements. The charges may be all steel scrap with suitable additions of silicon and manganese-bearing materials to provide an average iron over the spout containing 1.50 to 2.00 per cent Si, 0.50 per cent Mn, 2.75 to 3.25 per cent TC, and 0.100 per cent S.

Iron from the cupola usually is desulfurized by pouring it over fused sodium carbonate in the bottom of the ladle. Undoubtedly, the same purpose can be accomplished by injection of calcium carbide into the molten metal. Amount of sulfur removed will depend on a number of factors including initial sulfur content, amount of desulfurizing agent per weight of metal, time available, and metal temperature.

Following desulfurization, the slag is removed carefully, and the clean iron poured into the preheated converter which is tilted to receive it. Converter lining prior to use should be raised to as high a temperature as possible through use of an oil or gas burner or other means, preferably to around 2400° F. Amount of metal placed in the converter appears to vary slightly, and is judged by removing the cover on the tuyeres and locating the height or level with the bottom tuyeres when the converter is rotated or turned up to within a few degrees of the vertical position. That position varies with the operators, and is given as 5 to 9, 6 to 10, and 10 to 12°. Whatever position is selected, molten iron is added or removed to bring about the desired level, the cover plate placed on the tuyeres, and the blower started. Simonson describes the reactions as follows:

"In a few moments sparks and smoke will come out of the converter mouth, but very little flame. Sparks should be copious, large and scintillating and light yellow in color, the smoke noticeable, but not to voluminous and not too dark brown in color. An experienced operator by noting the appearance of the sparks and smoke can tell during the first minute of the blow whether the silicon content is right and if he is going to have a hot blow or if it will be necessary to doctor it up as it goes along. In 3 to 5 minutes the character of the sparks should change and become nonscintillating, and at the same time a flame should appear at the mouth of the converter. This is the beginning of the boil and the converter position should be advanced 2 to 3° to compensate for the shrinkage in bulk due to the elimination of the impurities.

"During the next 4 or 5 minutes the flame increases in brightness and volume until what is know as the boil occurs. The flame should be carefully watched and if there is any tendency to throw out any metal the blast pressure should be reduced. In extreme cases it may be reduced to 1½ psi, but this is as low as it is advisable to go.—After maintaining its top position for 1 or 2 minutes the flame dies down somewhat and remains in a quiet condition for some minutes. The flame then rises again, becomes particularly bright and clear, and finally dies down for the last time with the evolution of brown smoke.

"The blow should be turned down a few seconds before the brown smoke appears since this smoke represents burning iron which means waste of metal and ruination of the remainder. The operator throws over his controller, turning down the vessel into the horizontal position, and signals for stopping the blower. At this stage there is in the converter a batch of practically pure iron at well over 3000° F.

"To recarburize it to the desired point, a weighed final addition of ferromanganese, ferrosilicon, silicospiegel or what not, is introduced. This may be added melted, in which case a small cupola or crucible furnace may be used, or it may be thrown in cold in lumps at the mouth of the converter immediately after turning down the blow before the slag gets too hard. In this case the lumps must first be dipped in water so that the explosion of the vapor as they strike the hot slag, will part them and allow the alloy to go entirely into the bath of metal.

"This latter method has been found by the author to be by far the most useful and regular way of adding final additions. A special shaped core for skimming back the slag is fixed in the mouth of the converter and the metal then is ready to be tapped into the ladle."

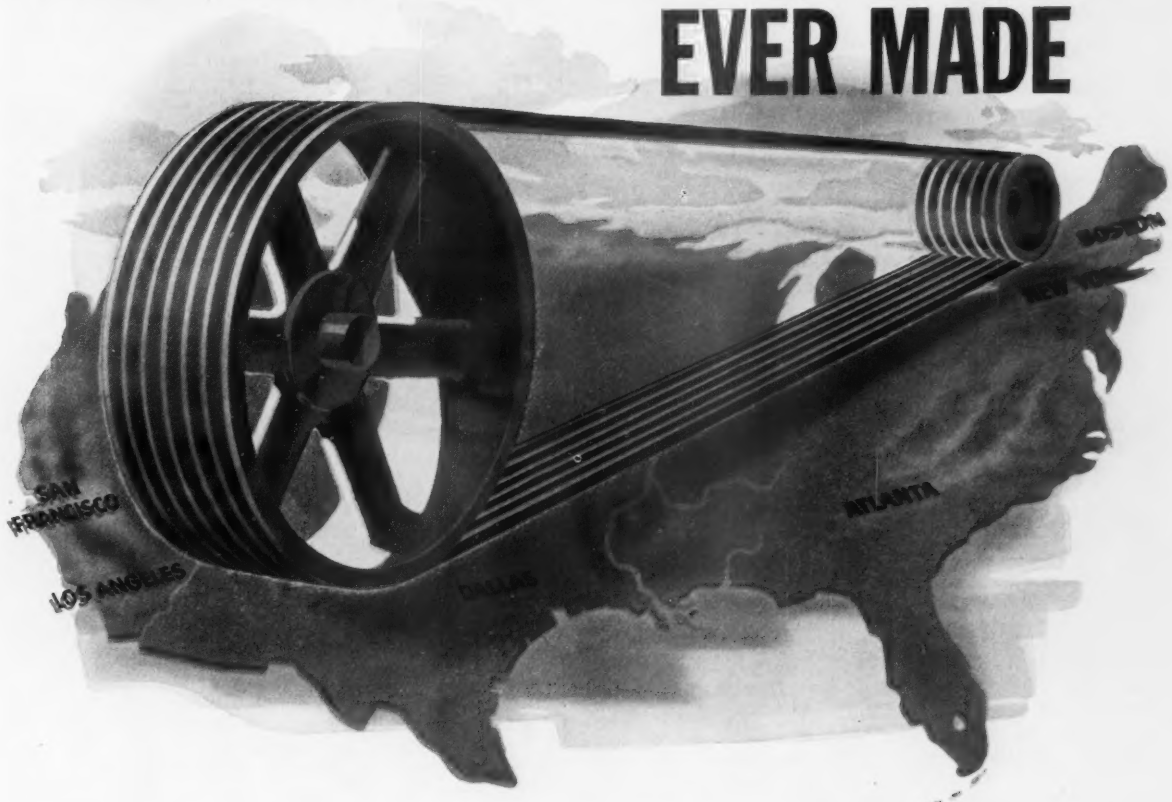
Specimen Shows Tin Present

We are sending you a small specimen of what we consider to be a tin bronze containing 90 per cent copper and 10 per cent tin. The customer claims the analysis shows no tin, and instead claims it is a silicon bronze. Can you give us your opinion?

Although we are not equipped to perform analytical examinations, we dissolved a small amount of drillings from the submitted sample in dilute nitric acid and obtained an appreciable precipitate of metastannic acid, which indicated the presence of tin. For the purpose in hand, that appeared sufficient. If a complete analysis is desired, it is suggested that a specimen be submitted to a commercial laboratory engaged in chemical and physical testing.

US RUBBER V-BELTS

MOST DARING TEST OF ITS KIND EVER MADE



Proves unequaled "match-ability" of U.S. Rubber V-Belts

We wanted to see what climate and what age might do to U.S. Rubber V-Belts. Would they still match?

Sticking our chin out, we picked at random—right from stock (and without measurement)—a size C-144 U. S. Rubber V-Belt from each of six different cities across the country. Each belt was shipped in a sealed carton which was not opened until the six were put on a single drive.

Result: *All six belts matched.*

And to prove this was no accident, we performed the same test with hundreds of U. S. Rubber V-Belts. Again, the matching was flawless.

You may never have to put your V-Belts to such an extreme test of "match-ability", but it is good to know that U. S. Rubber's method of building belts—up to 15 feet—and other engineering advances, assure you of a perfect match, *anywhere, any time.*

Contact any "U. S." power transmission distributor, or write us at Rockefeller Center, N. Y. 20, N. Y.

US RUBBER

Mechanical Goods Division

United States Rubber

See things you never saw before. Visit U. S. Rubber's new Exhibit Hall, Rockefeller Center, N. Y.

Circle 650 on Page 51

Men of Industry

● ROSS L. GILMORE
. . . heads Steel Founders

● CHARLES L. THOMPSON
. . . joins Magnesium Co.

● WILLIAM PETERS
. . . becomes branch mgr.

● J. F. B. JACKSON
. . . becomes managing director

ROSS L. GILMORE, president and general manager, Superior Steel & Malleable Castings Co., Benton Harbor, Mich., was elected president of the Steel Founders' Society of America at its recent annual meeting. Associated with Superior Steel since graduation from University of Michigan, he served previously as a trainee, foreman, superintendent, general manager, and vice president. In 1955 Mr. Gilmore was presented the Lorenz Memorial Gold Medal of the SFSA in recognition of his service to the industry and the society.

David G. Pettigrew has been appointed manager of the Baltimore branch office, Whitehead Metal Products Co., New York. **John Marple,** since 1946 sub-branch manager in Baltimore, has succeeded Mr. Pettigrew as Philadelphia sales manager. **Carl S. Newmarch,** recently product manager of stainless steels in New York, has been made assistant branch manager in Philadelphia. **Robert W. Marriott,** formerly in charge of stainless steels in the Philadelphia area, has been transferred to New York as product manager of stainless steels for the company.

H. M. Fisher has been named vice president-engineering and production, Biggs Foundry & Fabricating Co., Akron, Ohio, subsidiary of Union Spring Co., New Kensington, Pa. Until recently he was associated with Firestone Tire & Rubber Co., Akron.

● **Charles L. Thompson** recently joined Magnesium Co. of America, East Chicago, Ind., as general sales manager. Mr. Thompson has been manager of sales, Aluminum Extrusion & Tubing Div., Reynolds Metals Co., Louisville, general manager, Buda Engine & Equipment Co., and general sales manager of the Buda Co. Div., Allis-Chalmers Mfg. Co., Harvey, Ill.

● **William Peters** has joined American Air Filter Co., Louisville, as manager of the New York branch office. He was formerly assistant general sales manager, Anemostat Corp. of America, Chicago.

Ward F. Simmons has been appointed chief of the high-temperature metals research division, Battelle Memorial Institute, Columbus, Ohio. Since he joined Battelle 17 years ago, Mr. Simmons has been engaged in research on high-temperature properties of titanium, zirconium, beryllium, and their alloys.

William H. Shinn has been named assistant to the president, Gunite Foundries Corp., Rockford, Ill. Other appointments include **Harry F. Forbes,** sales manager of industrial products, and **S. A. Malthaner,** director of engineering.

Frank P. Veach, formerly associated with Hydroblast Corp., Chicago, has been appointed sales representative, Pekay Machine & Engineering Co. in the Chicago metropolitan area.

● **J. F. B. Jackson** has been appointed managing director, A.P.V.-Paramount Ltd., Crawley, Sussex, England. In 1954 he joined the company as deputy managing director after five years as director of the British Steel Castings Research Association. Mr. Jackson has also joined the board of P. I. Castings (Altrincham) Ltd., Altrincham, Cheshire, England.

William B. Nicholson, since 1956 manager of development and engineering service, Linde Co. Div., Union Carbide Corp., New York, has been appointed vice president in charge of gas products. He joined the Newark, N. J., development laboratory in 1935.

M. A. Winter has been assigned to a southwest sales territory for Bay State Abrasive Products Co., Westboro, Mass., which includes Arkansas, Oklahoma and the Texas Panhandle. Other sales appointments within the company include: **Robert H. Floodstrand** and **John E. Allen,** Chicago area; **Daniel M. Vlaun Jr.,** Metropolitan New York; **Gerald A. Curylo,** Connecticut; **Arnold D. John,** Philadelphia; and **John G. Berg,** New England.

Robert J. Brady has been named manager of the Chicago office, Jeffrey Mfg. Co., Columbus, Ohio, succeeding **James Green,** resigned. **William A. Lewis,** formerly in the Houston office, has been made district manager in Jacksonville, Fla., a position formerly held by Mr. Brady.

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

What are the Pro's and Con's of the Water-Cooled Cupola?

A good, pointed question—and one that's been drawing hazy replies since Dr. Gmelin first water-cooled a cupola a half century ago. But there is an answer . . . to this and all other questions that crop up when water cooling is discussed. You'll find them in "Water-Cooled Cupolas," the new full-color bulletin that contains the latest information as compiled by Whiting—the corporation that knows cupolas and cupola problems . . . the supplier whose cupolas melt more than 90% of the iron produced in the USA! Write for two copies today. (One for your file, one to pass around.) Ask for Bulletin FY-176. *Whiting Corporation, 15628 Lathrop Avenue, Harvey, Illinois.*

WHITING FOUNDRY EQUIPMENT

MEMBER OF THE FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION

● KENNETH SELBY

● ROY C. HOBSON

● MARK MILLER

● MELLOR W. STEVENSON

National Malleable divisional appointments

Robert D. Prushing, previously assistant manager, has been appointed manager of the distributor sales department in the Columbus office.

● **Donald L. Gross** has been appointed assistant sales manager, Shanafelt Mfg. Co., Canton, Ohio. He formerly handled sales of the company's steel flasks for Fred W. Fuller Co., Cleveland, Shanafelt sales representative.

● **Jack Fitzgerald** has been named foundry sales representative, Frederic B. Stevens Inc., Detroit, with headquarters at the company's Milwaukee office. A graduate of Marquette University, he has been engaged in foundry supply sales for three years.

● **Mellor W. Stevenson** has been named vice president-sales and **Kenneth Selby** vice president-engineering of the Railway and Mine Division, recently formed by National Malleable & Steel Castings Co., Cleveland. **Wilson H. Moriarty,** first vice president of the company, is chief executive officer of the new division, which includes the Sharon, Pa., and Melrose Park, Ill., plants, the Cleveland Technical Center, and International Operations. **Stowell C. Wasson,** corporate vice president, will be responsible for metallurgical research, process development, general purchasing, and similar divisional operations services. **B. C. Yearley,** his associate, has been made assistant vice president. **John F. Hutson,** former manager of the Railway Sales Division's Chicago branch, has been appointed assistant vice president-sales, Chicago, and **Ellsworth Sherwood** continues as vice president of International Operations.

Roy C. Hobson heads the new Industrial Division as vice president-general manager, which includes the Cleveland, Chicago, and Indianapolis plants. **Mark Miller** has been made vice president-sales for the division.

Mr. Stevenson has been manager of railway sales since 1957. Mr. Selby has been in charge of the Cleveland Technical Center since 1948, when he became chief engineer-Railway Division. Mr. Hutson has been manager of the Railway Sales Division's Chicago branch since 1948, and Mr. Hobson manager of the Chicago Works since 1955. Mr. Miller was made assistant to the vice president-sales in 1953. At the company's recent annual meeting **Gordon Patterson,** president, Square D Co., Detroit, was named a director. Other directors were re-elected.

Frederic S. Claghorn, formerly sales manager of the Foundry Div., Fletcher Works Inc., Philadelphia, has been appointed vice president of the division. Previously he was sales manager of the company's Centrifugal Div.

Lee E. Coulter has been named assistant to the president, American Hoist & Derrick Co., St. Paul. He joined the company 29 years ago. Mr. Coulter continues as assistant secretary of American Hoist & Derrick Co., and as president of Machinery Investment Corp., a subsidiary.

● **Roy Booth** recently joined J. B. Ehrsam & Sons Mfg. Co., Enterprise, Kans., as custom castings

(*Please turn to Page* 213)

● DONALD L. GROSS
. . . assistant sales mgr.

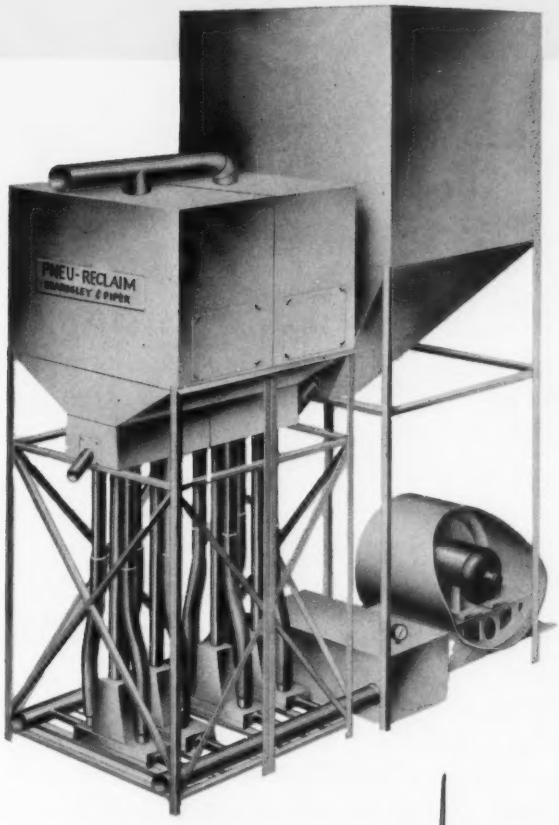
● JACK FITZGERALD
. . . Stevens foundry sales

● ROY BOOTH
. . . joins Ehrsam & Sons

Circle 652 on Page 51→

PROGRESS IN SAND PROCESSING

B&P PROGRESS REPORT



PNEU-RECLAIM

...FOR DRY SAND RECLAMATION YOU CAN AFFORD!

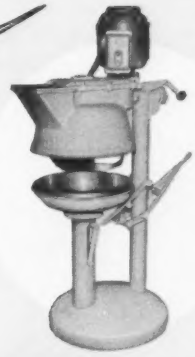
NEW FOR '58

- Cuts installation cost with package design
- Cuts operating cost with Dual-Jet Scrubbing
- Cuts maintenance cost with revolutionary, low-velocity operation
- Obsoletes all earlier units by capacity and quality performance

MULBARO

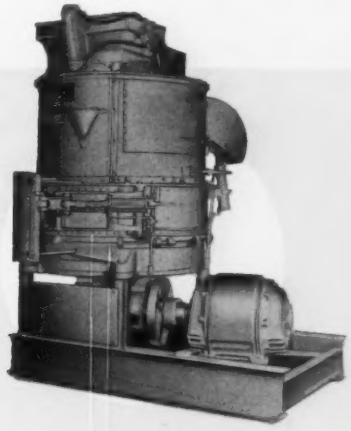
- The only really portable muller
- Lowest initial cost by far
- Lowest operating cost—no sand rehandling
- Several barrows used with one mulling unit
- Fast, thorough preparation
- Molding Sand—Core Sand—Shell Sand—CO_2 Sand—Airsetting Sand

NEW FOR '58



LABORATORY MULBARO

- New plow design
- New tilting mechanism
- New large inspection door
- New operating convenience
- New streamlined design



SPEEDMULLOR

- Most capacity per square foot of floor space
- Most capacity per dollar invested
- Lowest operating cost
- Compact Speedmullor-Preparator units for maximum sand conditioning capacity in minimum space

PROGRESSIVE FOUNDRIES LOOK TO
BEARDSLEY & PIPER
FOREMOST DEVELOPER OF FOUNDRY MACHINERY

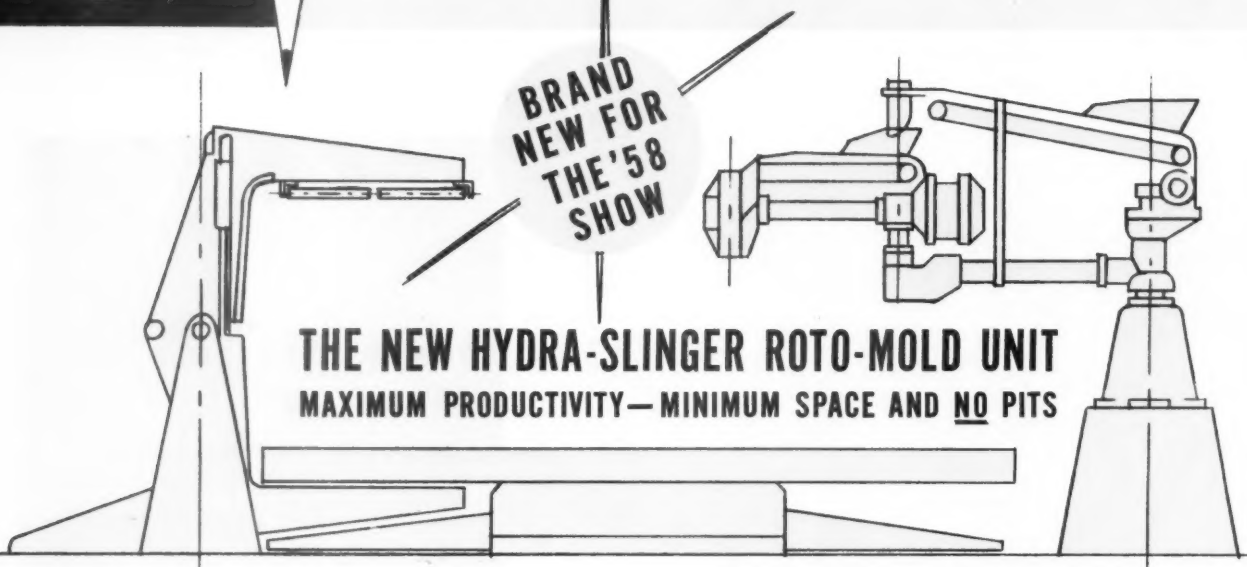
MEMBER FEMA

SEE THIS EQUIPMENT IN OPERATION AT THE AFS FOUNDRY SHOW

B&P PROGRESS REPORT

PROGRESS IN MOLDING

BRAND NEW FOR THE '58 SHOW



THE NEW HYDRA-SLINGER ROTO-MOLD UNIT

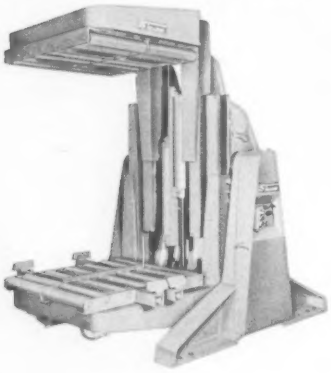
MAXIMUM PRODUCTIVITY—MINIMUM SPACE AND NO PITS

A NEW STANDARD OF PERFORMANCE

- No pits of any kind
- Faster, more accurate index
- More dependable
- Maximum productivity in minimum floor area
- Four-station production with one-station sand system
- Interlocking construction . . . it's really compact
- Multiple-station production for production *and* jobbing work

featuring the NEW

ROL-A-DRAW



- Capacities to 12,000 pounds
- Compact, floor-mounted
- Fast, smooth rollover, accurate draw
- Fully automatic cycle . . . no errors
- And no pits

NEW FOR '58

DIAMOND ALLOY TIPS AND LINERS

- New high impact strength
- New precision
- New super abrasion resistance
- New higher hardness
- New heat treat
- New quality control

SEE THESE NEW DEVELOPMENTS AT THE

PROGRESS IN COREMAKING

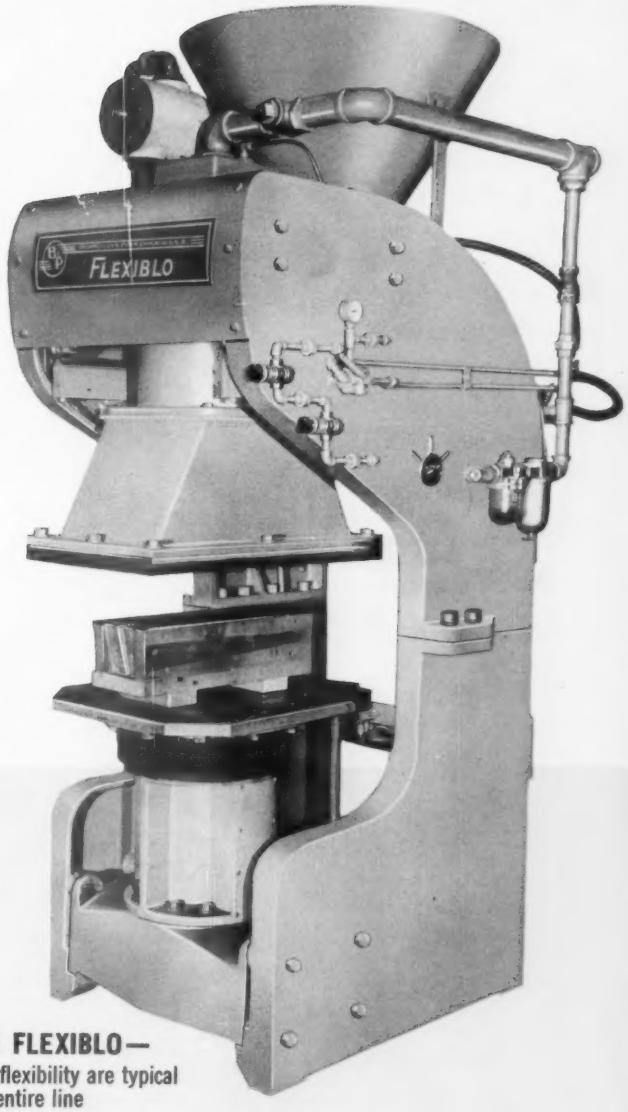
B&P PROGRESS REPORT

THE NEWEST LINE

THE WORLD'S FASTEST SELLING COREBLOWERS

7 sizes—to 400 pounds capacity

- Clean, streamlined design
- Cast steel frames for maximum rigidity
- Handles any sand blown by any machine
- Unequaled blow valve design
- Simplest all-pneumatic control
- Fail-proof automatic sequence operation
- Advanced design diaphragm table clamp
- Most accurate air-on-oil draw
- Choice of manual, semi-automatic, or automatic operation
- Minimum core box wear—blow-bys eliminated
- Handles any core box—wood or metal—that can be blown on any machine



THE CB15C FLEXIBLO—
its simplicity and flexibility are typical of the entire line

NEW FOR '58

NOW . . . more than ever before . . . if it can be blown at all, it can be blown harder, faster, at lower cost, and with less core box wear on a FLEXIBLO!

PROGRESSIVE FOUNDRIES LOOK TO
BEARDSLEY & PIPER
FOREMOST DEVELOPER OF FOUNDRY MACHINERY

MEMBER FEMA

AFS FOUNDRY SHOW

B&P PROGRESS REPORT

PROGRESS IN SHELL PROCESSING

the only complete line of SHELL SAND COATING EQUIPMENT

MODEL HP SPEEDMULLOR... the ONLY muller that resin-coats sand by all processes.

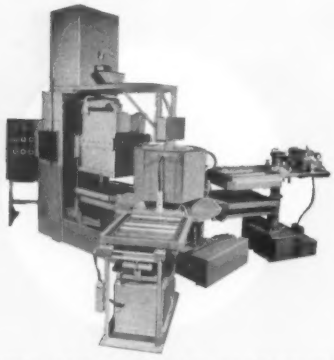
- Hot Process
- Cold Process
- Warm Process
- Novolak Process
- Any Other Process
- Shortest cycle by far
- Highest physical properties

SHELL SAND MULBARO

- Cold process
- Lowest cost—complete processing
- Controlled operation
- Liquid or powdered resin
- Really portable—really compact
- No heaters or auxiliary equipment require
- Highest capacity of any low-cost unit

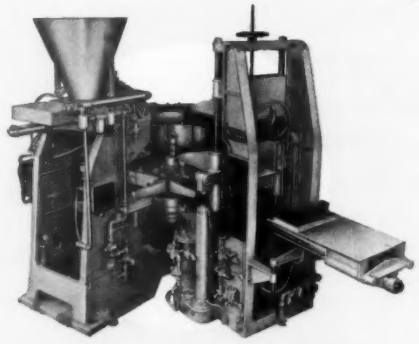
MODEL CP SPEEDMULLOR

- Cold process
- Develops maximum physical properties
- Four times faster than any other muller
- Greatly reduced resin contents
- Most capacity per square foot of floor space
- Most capacity per dollar invested



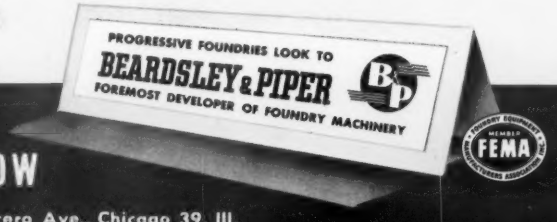
FORMATIC SHELL MOLD MACHINE

- Maximum productivity with minimum floor space
- Maximum flexibility for every production requirement
- One, two, three or four pattern units
- Automatic operation—every essential factor is precisely controlled
- Enlarge as required—package design



CORMATIC SHELL CORE UNIT

- Highest capacity at lowest man-hour requirement
- All-pneumatic control circuit
- Rotary index or shuttle-type
- Vertically or horizontally-split core boxes
- Solid, mandrel or dump-out type cores
- Automatic precision control



SEE THE B&P SHELL EXHIBIT AT THE AFS FOUNDRY SHOW

Beardsley & Piper, Div. Pettibone Mulliken Corporation, 2424 N. Cicero Ave., Chicago 39, Ill.

● HENRY APTHORP
. . . sales supervisor

● C. L. WEST

● F. TROY COPE

Electric Furnace Co. promotions

● HARRY X. WILKIE
. . . joins Davey Compressor Co.

sales representative in the Enterprise and Wichita areas. Previously he was associated with Electron Corp., Littleton, Colo., and Cessna Aircraft Co., Wichita.

● **Henry Apthorp** was recently appointed supervisor of industrial sales for the northern division, East Ohio Gas Co., Cleveland. He attended Case Institute of Technology and joined the company 20 years ago. Mr. Apthorp has been in the industrial sales department for the last ten years.

Harlan Twible, formerly sales manager of the Milwaukee office, Minneapolis - Honeywell Regulator Co., has been appointed vice president, manager - marketing, Hays Corp., Michigan City, Ind. Mr. Twible was graduated from the U. S. Naval Academy, Annapolis, and later took his master's degree at University of Chicago.

John L. McCaffrey, chairman of the board and chief executive officer, International Harvester Co., Chicago, has retired from active management after 49 years of service. He will continue as a director and member of the executive committee. **Frank W. Jenks,** president, succeeds Mr. McCaffrey as chief executive officer.

S. William Riley and **Everett G. Harvey** recently joined Quaker Rubber Div., H. K. Porter Company, Philadelphia, as chief project engineer and sales engineer, respectively. Mr. Riley was previously associated with McNeil Machine & Engineering Co., and B. F. Goodrich Co., both of Akron, Ohio. Mr. Harvey was formerly with Boston Woven Hose & Rubber Co., Cambridge, Mass., and Gates Rubber Co., Denver.

● **C. L. West** has been named chairman of the board of directors and **F. Troy Cope Jr.,** vice president-sales, Electric Furnace Co., Salem, Ohio. Mr. West joined the company's sales department in 1929 and became vice president in 1940. With the company since 1937, Mr. Cope has been in sales work since 1945. **K. U. Wirtz,** president of Electric Furnace Co., and the other executive officers were re-elected.

William A. Reich has been appointed manager of the engineering section, Metallurgical Products Dept., General Electric Co., Detroit. He joined the company's research laboratory in 1938.

Arnold A. Behling has been named controller, Albion Malleable Iron Co., Albion, Mich. Mr. Behling recently was treasurer-controller, Mautz Paint & Varnish Co., Madison, Wis.

O. W. Carpenter has been elected president, Chain Belt Co., Milwaukee, succeeding **L. B. McKnight,** who has retired and will continue as a consultant, director, and chairman of the executive committee. Mr. Carpenter joined the company in 1943 and became executive vice president last year.

Donald H. Teetor, chairman of the board, and **William B. Prosser,** president, Perfect Circle Corp., Hagerstown, Ind., have been elected directors, Aluminum Industries Inc., Cincinnati.

George Di Sylvestro recently joined the technical service staff, American Colloid Co., Skokie, Ill., as director of foundry research. For the last 16 years he has been associated with Burnside Steel Foundry, Chicago.

● **Harry X. Wilkie,** formerly sales engineer, Hewitt-Robins Inc., Stamford, Conn., recently joined Davey Compressor Co., Kent, Ohio, as mid-Atlantic regional manager, with headquarters in Ridgewood, N. J. He will cover metropolitan New York, Long Island, New Jersey, eastern Pennsylvania, Maryland, and Delaware.

Stewart Monroe has been named special representative-national accounts, Manhattan Rubber Div., Raybestos-Manhattan Inc., Passaic, N. J. **John McKinlay,** previously assistant sales manager of the packing division, has succeeded Mr. Monroe as manager of the northeast district.

Jules Parisi, president, Pekay Machine & Engineering Co., Chicago, has been in Europe investigating possibilities of manufacturing foundry and control equipment there.

Louis W. Jander has been made an assistant general sales manager, Materials Handling Div., Yale & Towne Mfg. Co., Philadelphia, where he will assist in supervision of industrial lift truck sales. **Carl O. Hedner,** also an assistant general sales manager of the division, will supervise hand and electric hoist sales. **Neal J. Kemp** has been appointed Detroit sales-service branch manager and will also be in charge of a sub-branch center in Grand Rapids, Mich. **James Rainey,** formerly south-central district sales manager, has succeeded Mr. Kemp as midwest regional sales manager, with headquarters in Chicago. **Philip R. Van Duyne Jr.** has become New York branch manager, succeeding **Joseph J. Murray,** who has been named a national accounts sales manager for Yale. Mr. Van Duyne was formerly sales manager in New York.

NON-FERROUS FOUNDERS' SOCIETY

Plans for Annual Meeting

ANNUAL meeting of the Non-Ferrous Founders' Society this year has been expanded to a day and a half to meet the needs of the industry for more current information on management problems. In addition, special meetings will be held to deal with society operating problems.

Scheduled for the early part of AFS convention week, the meeting will be held at the Hotel Carter, Cleveland, on Tuesday and Wednesday, May 20-21. Directors of the society will meet on May 19, and an executive committee meeting is scheduled for May 18.

General sessions are open to non-members as well as members of the society.

Emphasis has been placed on management subjects in the program arranged by the meeting committee headed by William L. Leopold, Northern Bronze Corp., Philadelphia. Principal subjects and speakers follow:

Tuesday, May 20—The morning session will include "Supervisory Incentives" by John W. Horner, Slack-Horner Brass Mfg. Co., Longmont, Colo., and "How To Get Your Share of the Market" by Richard C. Meloy, marketing director, Gray Iron Founders' Society, Cleveland.

The noon luncheon session will have William A. Meissner, director, Copper Division, Business and Defense Services Administration, Washington, as principal speaker. Other talks will be given by a representative of the Aluminum & Magnesium Division, BDSA, and by society president C. J. Egetter, Crown Brass Mfg. Co., Alhambra, Calif.

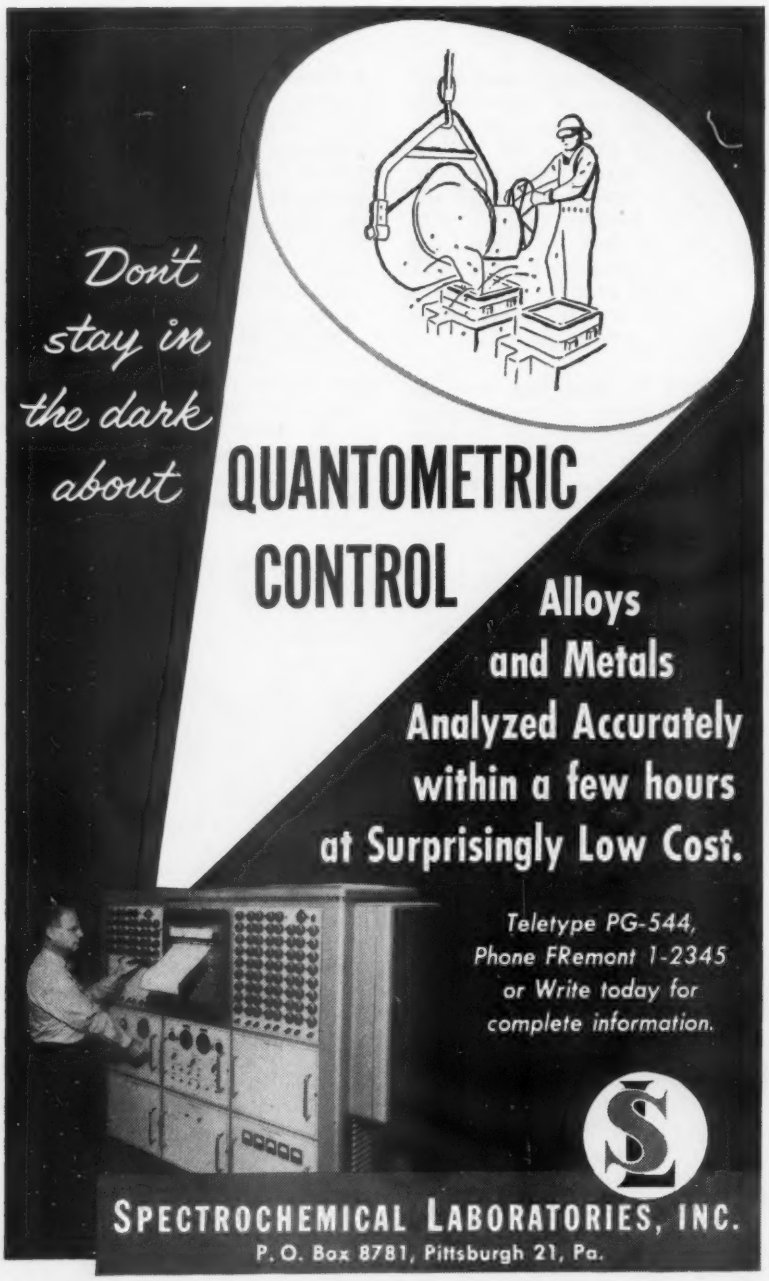
"Impact of Pension Trust Costs" by Ted Snyder, Russell M. Tolley & Associates, Indianapolis, will start off the afternoon session. It will be followed by a sales skit, entitled "Who Will Get the Order," to illustrate good and bad selling techniques.

Participants in the skit will include H. A. White, Smeeth-Harwood Div., Capital Brass & Aluminum Foundry Co., Chicago; Walter M. Clark, D. W. Clark & Co., East Bridgewater, Mass.; George T. Fischer, Fischer Casting Co., Dunellen, N. J.; James F. Gilbert, Gilbert Brass Foundry Co., St. Louis; J. H. Brennan, Pittsburgh Brass Mfg. Co., Pittsburgh, and Robert E. Dickison, Brass Foundry Co., Peoria, Ill.

The annual banquet Tuesday evening, to be preceded by a reception, will be addressed by Dr. George D. Heaton, Matthews, N. C. A specialist in human relations in industry, Dr. Heaton for several decades has been a leader in his field. He has appeared before numerous industrial, supervisory, and educational groups.

Wednesday, May 21—An afternoon session will be devoted to a demonstration meeting of the Cleveland cost comparison group, and will include a question period.

The panel which will discuss "How Cost Groups Help Management" will include William A. Gluntz Sr., Gluntz Brass & Aluminum Foundry Co., Cleveland; Edward J. Metzger, Multi-Cast Corp., Wauseon, Ohio; Urban von Rosen, Solway & von Rosen, Cleveland,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Circle 654 on Page 51

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That's why foundrymen who use NOMAD EQUIPMENT talk about increased production, profit-making efficiency and all the other advantages they get.

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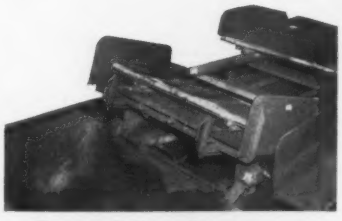
After molds are dumped, NOMAD Mold Dumps enable one operator to separate sand and castings from roller-equipped bottom boards or pallets, *quickly and easily.* The empty boards or pallets are automatically returned by gravity on the lower track of Nomad's Double Level Conveyor to the molding end of the line. At this point Pallet Raisers elevate the bottom boards or pallets to the top track where they are ready for the next molds.

Whether you choose a stationary dump to serve a single line or one movable dump which rides on transfer track to serve several lines, depends upon *your* operation. In either case, NOMAD Mold Dumps feature effortless operation, fast dumping and sturdy construction. They handle a wide range of mold sizes.



Empty Pallet about to return onto lower return track.

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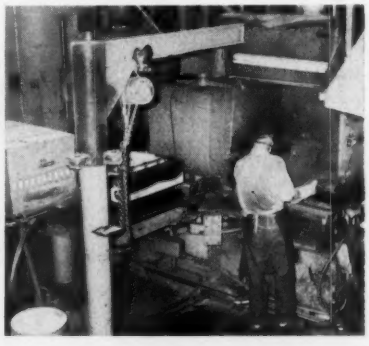
NFFS national cost consultant, and Eugene M. Hinze, E. T. Runge Associates, Cleveland.

Several closed meetings also are scheduled. They include a dinner for past and present national officers, directors and alternates the evening of May 19 at the Cleveland Athletic Club; a chapter officers breakfast the morning of May 21 at Hotel Carter, and a national cost group meeting in the late afternoon of May 21.

The Non-Ferrous Founders' Society will conduct a booth at Cleveland Public Auditorium during the Foundry Show of the American Foundrymen's Society, May 19-23.

Shell Processing Operations Are Depicted in New Film

A new film, "Shell Processing Comes of Age," has been produced by Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago. A 16-mm, color film complete with



sound, it features operations at five outstanding shell molding foundries of the United States and Canada.

Operations are shown of both jobbing and production work. The film includes complete description of the mechanics of coated sands, and features shell sand processing operations with both hot process and cold process equipment and with stationary and portable equipment.

Prints are available for showing before interested groups. Write to the company, 2424 North Cicero Ave., Chicago 39, Ill.

Cutler-Hammer Buys Firm

Cutler-Hammer Inc., Milwaukee, will purchase the business and assets of Airborne Instruments Laboratory Inc., Mineola, N. Y., an electronics firm, through an exchange of stock. Airborne will be operated as a division.

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For information on shipments and availability of special alloys and sizes, contact our nearest sales office, or write: Aluminum Division, Olin Mathieson Chemical Corporation, 400 Park Avenue, New York 22, N. Y.

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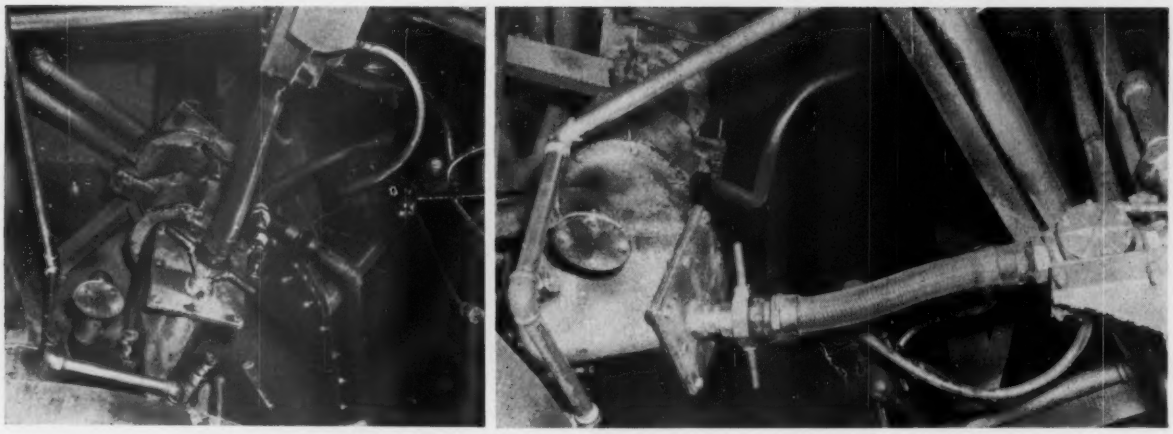

Injection device has a special valve to control compressed air shooting of borings into the cupola. The complete system is shown mounted on cupola at left. The view at right is a close-up of the valve, showing 2-in., flexible air line attached

Shooting Borings into Cupola

Reduces Melting Cost

By R. E. DIXON
Foundry Metallurgist
Cadillac Motor Car Div.
General Motors Corp.
Detroit

EQUIPMENT for injecting cast iron borings into the cupola melting zone is being used in the foundry of Cadillac Motor Car Div., General Motors Corp., Detroit.

Original experimental work at Cadillac and that done by German foundrymen indicated that less coke is needed to melt borings because heat is transferred to them more efficiently than to more conventionally sized cast scrap. Because of their great surface area, borings melt within a few seconds after contact with incandescent coke. Experience with a cupola lined to 35 in. showed that melting rate increased from 5 tons an hour to 6.7 tons an hour.

Heart of the system is a special valve developed in Germany. It controls the compressed air shooting action that delivers an accurate quantity of borings into the cupola. Other components of the system include a receiving hopper for the borings on the charging floor; a 10-in.-diam vertical pipe leading to the valve; a high-pressure air line, timer, and solenoid valve integrated to supply quick shots of air at regular intervals, and a port leading from the valve through the cupola lining into the melting zone. Total cost of the equipment needed for the components and installation is less than $4500.

The Cadillac Installation—The system, which currently is graduating from the experimental stage, is installed on one of four modified front slagging cupolas lined to 64 in. at the melting zone. Later three of the special injector valves may be installed on each of the four cupolas. The same equipment can be used to introduce desulfurizers such as calcium carbide and fluorspar intermixed with the borings. Ferroalloys also may be shot into the cupola instead of adding them in the ladle.

The cupola is cooled internally with water glands. Tapping is continuous into a 6000-lb receiving ladle. The cupola is run every fourth day for 16-hr, alternating with the three other cupolas in the foundry. Charges average 41 per cent cast iron scrap, 20 per cent steel scrap, 24 per cent malleable pig iron, 5 per cent silvery pig (16 per cent Si), and 10 per cent cast iron borings injected into the melting zone. The metal to coke ratio is 10 to 1.

Borings in steel tote boxes holding 1300 lb are dumped by a fork lift truck equipped with a rotary head attachment into the hopper on the charging floor. A coarse screen on the hopper removes oversize foreign materials that may get mixed into the borings. The hopper funnels the borings into a 10-in.-diam vertical pipe adjacent to the cupola. The pipe is 16 ft long, terminating at the injector valve, and holds about 1000 lb of borings. A manually-controlled gate is located in the pipe a short distance above the valve to permit stopping the flow of borings during shutdown.

Currently, cast iron borings constitute 5 to 10 per cent of the charge. They are injected as batches or shots weighing 7 to 9 lb. The driving force behind this shot is compressed air at 140 psi. A 2-in. pipe delivers this air to the valve.

Shot Frequency May Vary—We have experimented with shots varying from one every three seconds to one every ten seconds. Shots every eight seconds seem to be best for our operation. A timer automatically energizes a solenoid valve which opens the high-pressure line for the required period.

If the size of the shot is too big, or if shots are made too frequently, the chips will not have time to melt out of the way before the next batch arrives. The ultimate result is a freeze-up in the port, necessitating shutdown and cleanout with a bar or chisel.

A clapper valve is located at the front of the valve. It is held shut by compressed air introduced in front of it at the same pressure as the cupola blast. The air stays

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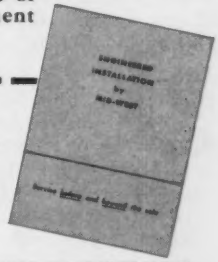

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Circle 657 on Page 51

on all the time and keeps hot cupola gases from entering and damaging the valve. When the high-pressure air line is opened every eight seconds, the sudden surge of excess pressure flips the clapper valve open and drives the chips into the cupola. The high pressure air is cut off almost instantly by the solenoid-actuated valve. The low-pressure air line in front of the clapper valve quickly slams it shut.

A port leads from the valve through the cupola shell, water gland, and lining. After considerable experimentation it was found that 3 ft above the tuyeres was an optimum location for the port. Trial locations ranged from 18 in. to 60 in. If the port is too low it overheats and if too high the temperature of the stack is too cold to melt the chips, and they freeze in front of the port.

Why Use Borings?—The cast iron chips charged into the cupola come from our own machine shop, so we have an accurate record of their composition. If demand exceeds supply, additional chips can be purchased on the scrap market. To maintain a realistic view of the economics involved, our machine shop chips are valued at current market prices. When the market value of chips is around $28.50 a gross ton and No. 1 cupola scrap is being quoted around $39 a gross ton, the differential of $10.50 exists on every ton of chips consumed. We are using 24 to 26 tons of cast iron chips in a 16-hr day. A saving of $252 to $273 a day is possible in raw material costs.

Besides installing the borings injector, we also switched to the use of high-density coke. The high-carbon, slow-burning coke has contributed substantially to our being able to melt 30 tons an hour in the same cupola that formerly produced only 15 tons an hour. Concurrent with the higher melting rate, it was possible to reduce the amount of coke needed to melt a ton of metal. Five years ago the Cadillac foundry operated four cupolas, two each day, on alternate days. Now only one cupola a day carries a much heavier work schedule.

Additional savings from a one-cupola operation are lower refractory cost and reduced labor force in the melting department. Because one cupola serves all molding lines in the foundry, metal is used rapidly. Consequently, the cupola can be operated at near its best rate and tapping temperature can be lower because metal does not remain long in the receiving ladle. Currently,

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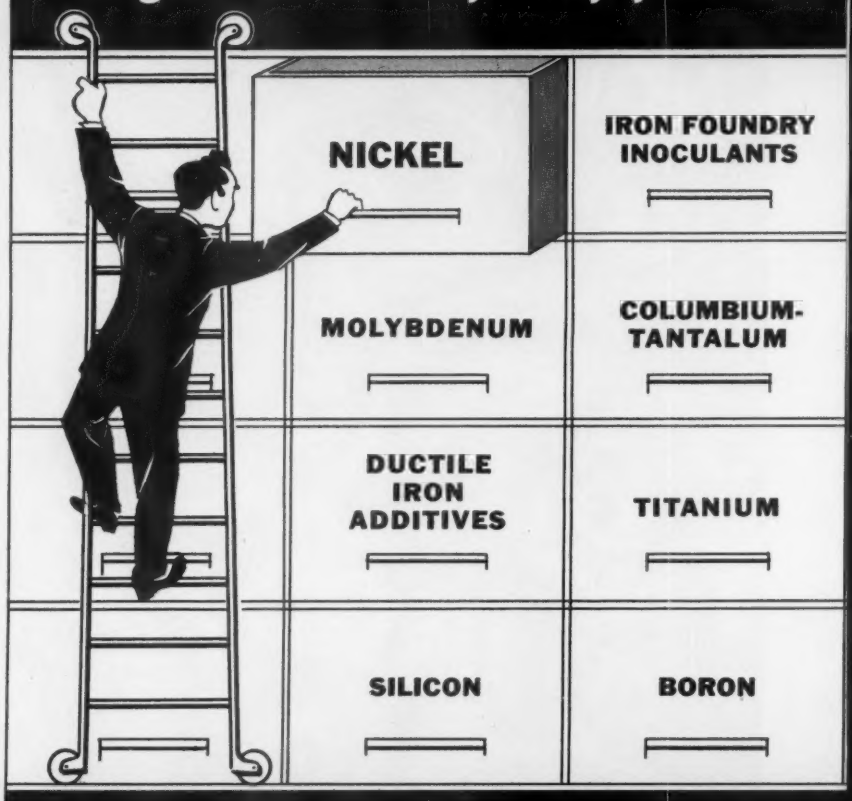

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These foundry alloys are all the quality products of such leaders in industry as The International Nickel Co., Vanadium Corporation of America, and Shieldalloy Corporation.

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Plus Items for Foundries:

Welding Rod – Whitehead Metal "Supermarkets" maintain full stocks of a wide range of welding and brazing supplies. Two of the most popular items are Ni-Rod and Ni-Rod "55" Electrodes which many foundries use in salvaging castings with defects, for repairing heavy sections and joining dissimilar metals. Check your Whitehead man for detailed information.

Aluminum Core Plate – Strong, light-weight, easy to use. Good long-lasting flat core plate available "off-the-shelf" from Whitehead.

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metal is tapped at 2780° F and poured into molds at 2650° F. When two cupolas were operated each day, metal was tapped at 2850° F to achieve the same pouring temperature.

There Are Some Problems — Foundrymen know that every operation has a good and bad side. It would be rash to overlook some of the unfavorable aspects of this installation. Probaby the most exasperating problem is the freezing of chips in front of the port. The only way we have been successful in opening the port is to turn off the blast, unbolt the valve, swing it to one side, and chisel out the frozen batch of chips. This operation stops the flow of iron for ten minutes to one-half hour. In an integrated production foundry such as ours, activities either cease or slow down in the charging, pouring, shakeout, and cleaning departments. This problem would not be so serious in a jobbing foundry.

Control of chemical analysis, especially silicon, is subject to inaccuracies when injecting borings. Our experience shows that additional silicon is required to maintain the proper chemical analysis. Average cost of the extra silicon is approximately 47 cents a ton melted. The problem is serious only if an attempt is being made to hold narrow analysis limits. When the port freezes up, however, metal analysis will vary markedly. During the freeze-up, iron may have to be pigged or poured at the risk of making scrap castings.

Availability of scrap could be an important factor influencing a decision to use borings. If a foundry is in an area where heavy scrap is scarce and expensive but machine shops are generating a copious supply of cheap borings, an injector may prove profitable.

Society Revises Booklet On Steel Casting Design

Publication of a revised edition of *Fundamentals of Steel Casting Design* has been announced by the Steel Founders' Society of America. Previous edition of the booklet, which has been out of print for several months, has consistently been one of the most popular items in the society's literature listing. Supplemented with data derived from recent research work, copies of the 1958 edition are available upon request to the Steel Founders' Society of America, 606 Terminal Tower, Cleveland 13, Ohio.

Circle 658 on Page 51

How to hold the edge on competition...

Let's agree on this basic point: *the real target for any foundryman today is production at lowest possible cost.* A strong, low-cost foundry operation means you're in an excellent *competitive position*—for extra business . . . for added profit.

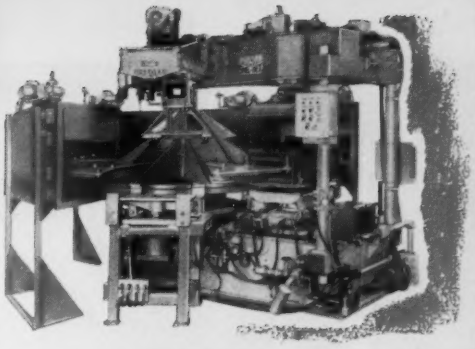
How do you build that "strong, low-cost operation?" At Osborn—we believe it works like this . . .

Low costs *do not* automatically or magically result from production equipment alone. There's a *balance* that must be set up between equipment and other operating factors in your foundry—*manpower . . . maintenance . . . scrap . . . floor space* and *traffic flow.*

Only when these operating factors *plus* efficient production equipment are in *balance* can you begin to cut costs and *operate competitively.* Osborn has that kind of know-how—over 50 years of application experience to help you hold the edge on competition.

Get details at the AFS Foundry Show . . . where a complete staff of Osborn foundry engineers will discuss and demonstrate advanced techniques—and display a cross-section of Osborn's famous line of production machinery. *The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

advanced equipment methods for foundries are by OSBORN



SHEL-DEX*
Shell Production Machine
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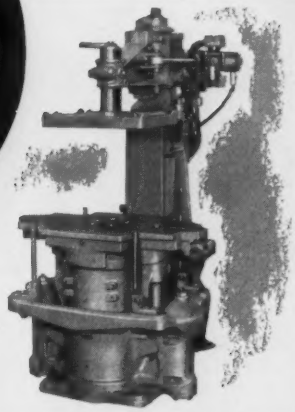

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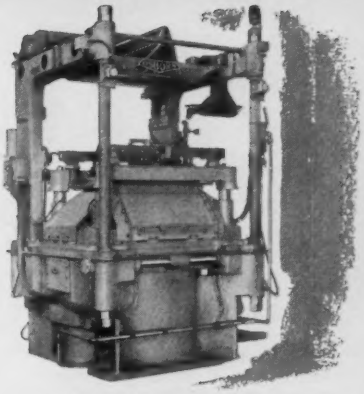

JOLT-SQUEEZE-STRIP
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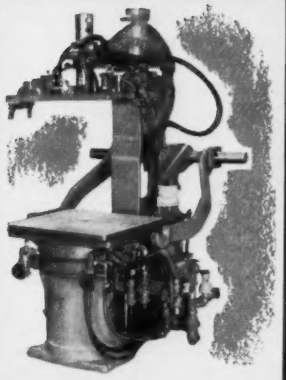

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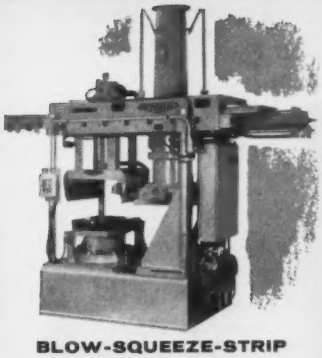
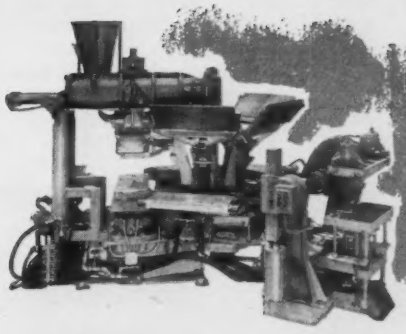


BLOW-SQUEEZE-STRIP
Molding Machine



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Circle 659 on Page 51

Ross L. Gilmore, right, chosen president of SFSA at its recent annual meeting, with four newly elected directors. Left to right are B. V. Thompson Jr., C. H. Welch, C. C. Brownmiller, and Walter A. Miller

Society's Program Strength Cited at

STEEL FOUNDERS' MEETING

By FRANK G. STEINEBACH
Editor

IN the face of reduced demand for castings, the steel foundry industry has weapons in its arsenal to combat the situation. This was the theme of the retiring president, Howard F. Park Jr., vice president, sales, General Steel Castings Corp., Granite City, Ill., in his report opening the 56th annual meeting of the Steel Founders' Society of America at the Drake Hotel, Chicago, March 17-18.

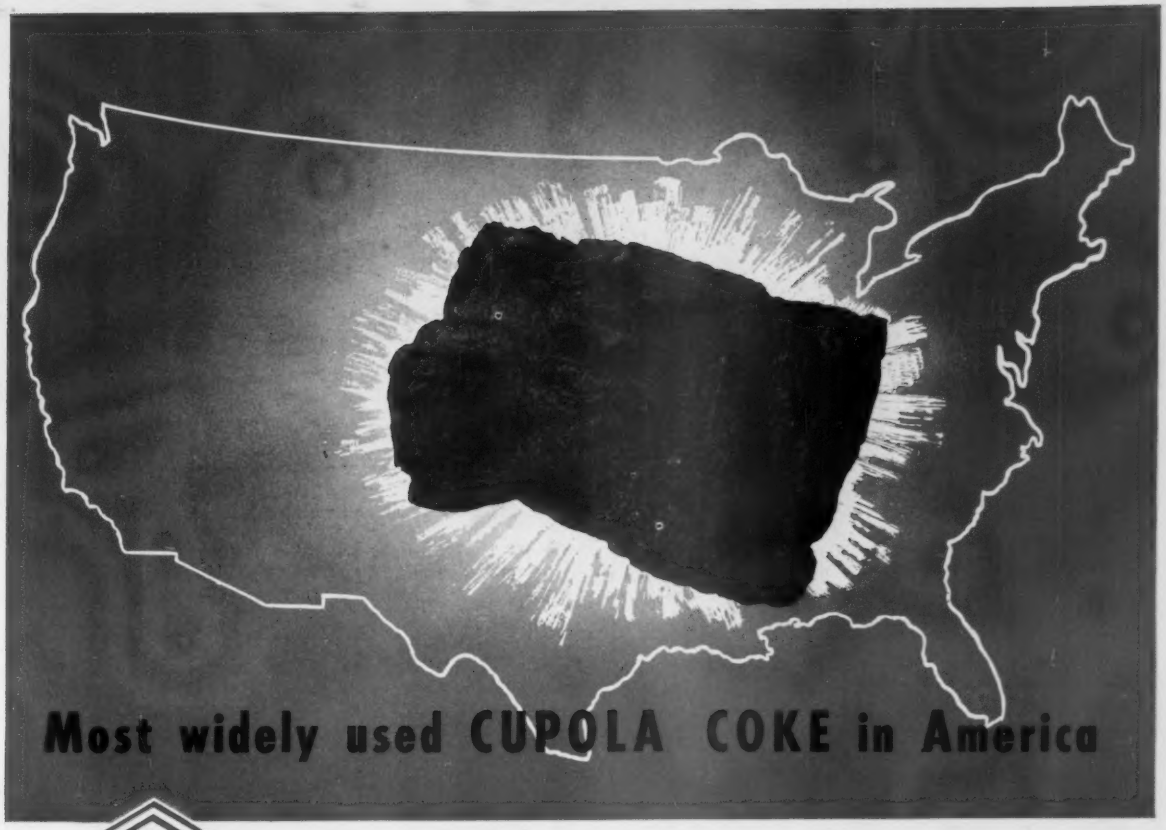
Mr. Park believes the society and its programs are the arsenal—the industry's weapons. The entire SFSA program is pointed directly toward two closely related goals—the production of better castings and a larger market for those castings. Better castings, according to Mr. Park, mean improved design, improved metallurgy, improved foundry practice, and improved raw materials, all of which come under the technical and research work of the society.

Better markets are the result of selling more to existing markets, opening up new ones which do not now use castings, and anticipating whole new markets in time to get in on the ground floor. This is the work of the market development phase of society activity.

As an example of useful weapons available through society work, Mr. Park cited the results of the Joint Refinery Task Force which produced a set of quality specifications for steel castings, thus bringing a high degree of standardization into a field which has been plagued by conflicting demands and uncertain requirements. The president also cited the work on standards for raw materials, including those for bentonite, zircon sand, and cereal binders along with research report No. 40 on "The Significance of Liquid Limit in Evaluating Steel Foundry Bentonites."

He reported that reaction by suppliers to these projects has been good. He also reported on the film "Photoelastic Study of Joined Sections for Castings and Weldments," produced by the society in collaboration with Case Institute of Technology, and indicated that its conclusions on the comparisons of castings and weldments are very much in favor of castings. Other activities of the technical and research program also were presented. Mr. Park emphasized that to make these reports and activities really effective weap-

Howard F. Park Jr., retiring president, right, is presented gold medal award for contributions to the society



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ons, they must be used by the companies directly in the business of selling steel castings.

Mr. Park referred to several important activities in market development. During the year two sets of slides were made of all the materials from product development contest number two. These made an impressive collection of useful material on many aspects of casting design which he said, should be used by individual sales departments. Over the past year the product design study program has been improved in format and content and now is a high-powered weapon, if used. Mr. Park also suggested the enlargement of the basic mailing list of the society through additions by each individual member company.

In conclusion, Mr. Park stated that members of the society "have an important stake in a remarkable and durable organism, the American free enterprise system. We have a sound, mature industry, capable of high quality production for a wide and growing market. We have one of the finest trade associations in the world, with a solid, well-conceived program of activities designed to produce direct benefit to its members. We have an outstanding staff of dedicated men and leadership of the highest caliber. And we have the immense vitality, talent, and managerial skill of the members of SFSA. What do we have to be afraid of? Let's get to work."

Edward A. Short, left, and Sands G. Falk, right, receive certificates of appreciation from President Park for their service at Washington as chiefs of the Castings Branch, Iron and Steel Division, BDSA

Changing Values — Speaking on "The Changing Aspect," F. Kermit Donaldson, executive vice president of the society, pointed out that design knowledge and progress in the metallurgical sciences have been such that the dimensions of any given structure tend to become less while the strength is increasing. This, in turn, generates new problems in production, and these problems in themselves generate new requirements in design knowledge and metallurgical advances. Thus, the industry finds itself in a constant pressure orbit in which the ability to improve the relative competitive place will depend on agility in meeting these changing conditions.

Because the steel castings industry is trending in the direction of doing more with less metal, it is not keeping up, tonnagewise, with the general increase in industrial production, and probably will not in the foreseeable future. Therefore, Mr. Donaldson believes that it is time to use some other indicator than tonnage to determine what is happening in the steel castings industry. Steel castings are already a long-lived article, and relatively, tonnagewise, they will become longer lived in the future. In view of indicated rapid changes in technology, it will be important for the industry to know whether it is advancing, standing still, or going backward. Tonnage alone will not tell the story.

Mr. Donaldson emphasized that foundries are in business to make money. To make money and do all of the things eminently desirable, such as employing people, paying wages, paying taxes, etc., it is necessary to operate at a profit. Much of the progress of industry has taken place because retained earnings have been plowed back into the business.

Continuing, Mr. Donaldson pointed out that the prime consideration of any society activity must be to assist the industry to make money. Nevertheless, the society is able to do some things that would be practically impossible for individ-

Gerald J. Grott, left, winner of the Gustav A. Lillieqvist award, and Victor E. Zang, recipient of the Technical and Operating medal

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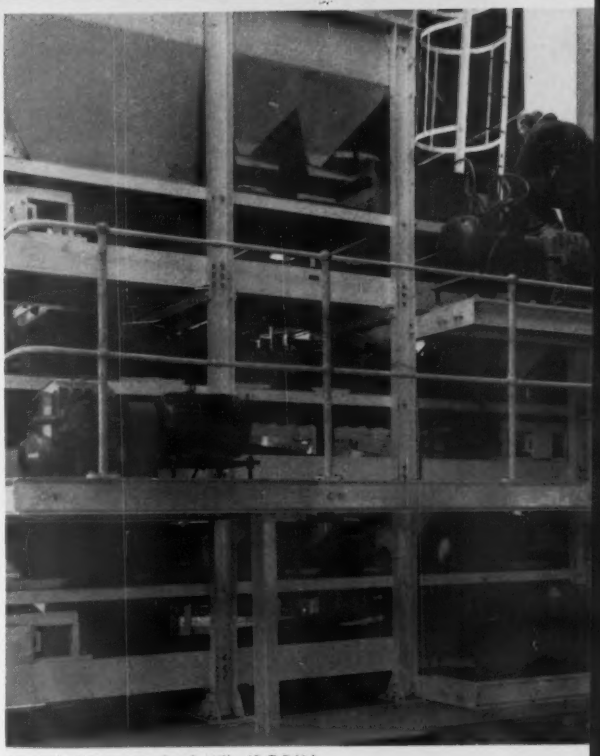

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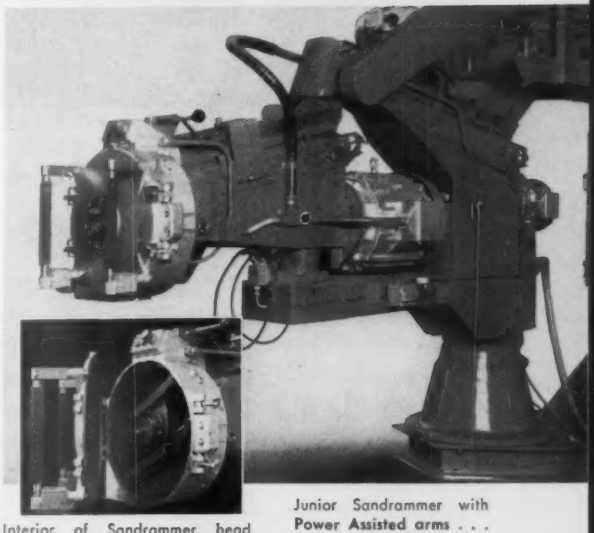

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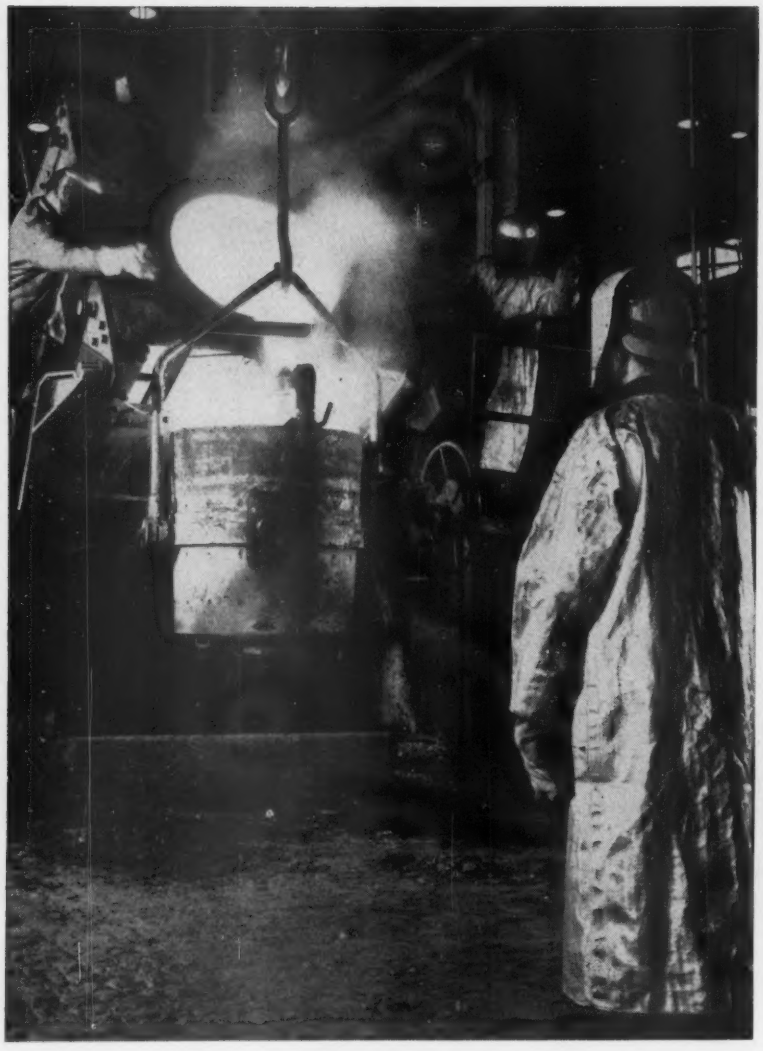

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ual members because the society has the united strength of all members. As an illustration, Mr. Donaldson cited attempts to protect the supply of heavy melting scrap which, the government now reports, faces an impending depletion. In conclusion, Mr. Donaldson indicated the strong conviction that the steel castings industry, through individual and society efforts, will meet the changing aspects of our times.

Officers and Directors—Ross L. Gilmore, president, Superior Steel & Malleable Castings Co., Benton Harbor, Mich., took office as president of the society. B. P. Hammond, Foundry & Mill Machinery Division, Blaw-Knox Co., Pittsburgh, was re-elected vice president; R. G.

F. Kermit Donaldson, executive vice president, SFSA, addresses annual meeting of the society

Parks, treasurer, National Malleable & Steel Castings Co., Cleveland, was re-elected treasurer. Re-elected staff officers of the society include F. Kermit Donaldson, executive vice president; Charles W. Briggs, technical and research director; George K. Dreher, market development director; and Erwin Dieckmann, assistant secretary.

Newly elected directors include C. C. Brownmiller, manager, casting sales, Treadwell Engineering Co., Easton, Pa., Division One; B. V. Thompson Jr., vice president, Texas Steel Co., Fort Worth, Tex., Division Three; C. H. Welch, president, Alloy Cast Steel Co., Marion, Ohio, Division Five; Walter A. Miller, president, Keokuk Steel Casting Co., Keokuk, Iowa, Division Seven.

Society Awards—At the luncheon meeting, the Frederick A. Lorenz gold medal of the society was presented to Howard F. Park Jr., vice president, sales, General Steel Cast-

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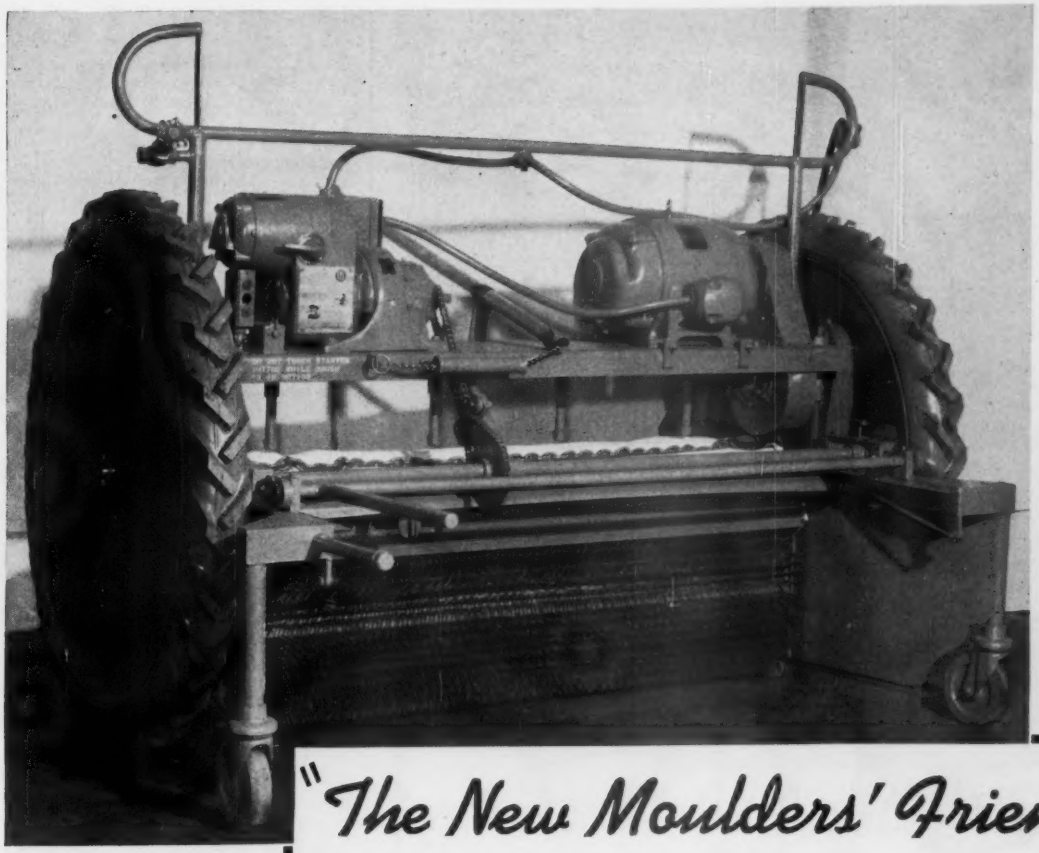

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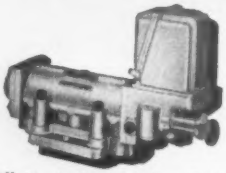
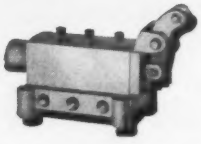


½" Single Solenoid Two Position 4-way "B"-type Valve, for Pressures up to 250 psi.



¼" 4-way Cam Operated Spring Return Valve, for Pressures up to 125 psi.

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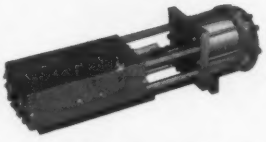

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ings Corp., Granite City, Ill., for his valuable contributions to the society. The Technical and Operating medal of the society was presented to Victor E. Zang, vice president in charge of research and development, Unitcast Corp., Toledo, for years of outstanding service to the society and the industry.

The Gustav A. Lillieqvist award was presented to Gerald Grott, assistant plant manager, Michigan Standard Alloy Casting Co., Detroit, for the excellence of his paper in *Steel Foundry Facts* during 1957, "Evolution and Control of Foundry Clays from Room Temperature Laboratory Tests." The second *Steel Foundry Facts* award was won by Harold Bishop, Exomet Inc., Conneaut, Ohio, and Howard F. Taylor and R. Guy Powell, Massachusetts Institute of Technology, Cambridge, Mass., for the paper "Calculations for Risers with Exothermic Sleeves."

Certificates of appreciation were presented by the society to Edward A. Short, assistant works manager, Mid-Continent Steel Casting Corp., Shreveport, La., and to Sands G. Falk, manager of marketing research, Falk Corp., Milwaukee, for their service as chief of the Castings Branch, Iron and Steel Division, Business & Defense Services Administration, Washington. The plaques read, "For the excellence and outstanding character of services rendered the steel castings industry; for unselfish devotion to duties oftimes onerous and complex, and for patriotic service to the United States of America."

Importance of Research—Charles W. Briggs, technical and research director of the society, pointed to the importance of research to the future of steel castings industry. He reported on the growth of steel castings research in Britain, France, Russia, Japan, the Netherlands, Sweden, Belgium, and Norway, and he indicated that such research is going forward in other countries.

Mr. Briggs pointed out that some industries are applying from 1 to 1.5 per cent of gross sales in research. The steel foundry industry in America is using very much less. If the research of the steel foundry industry were only one-quarter that of its competition, and government and other sources carried one-half of that effort, the society's research expenditure should total about $300,000. This goal could be reached, according to Mr. Briggs, if every member foundry would contribute only one-half the yearly wage of one laborer.

The speaker also considered how society research should be conducted

Circle 664 on Page 51

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. . . Increase daily core production
. . . Reduce box and core damage
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Greenlee Core Rollover and Draw Machines pay large dividends in high speed, economical core line production. These machines are capable of handling 50 cores per hour. Compare your present method with this production time! Greenlee Core Rollover and Draw Machines provide the flexibility needed for large and small core production.

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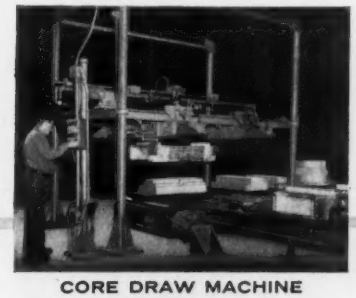

CORE DRAW MACHINE
Positions, clamps, vibrates, draws core boxes to 32" deep in 80 seconds.

Standardization of core box sizes is unnecessary . . . use your present boxes. Lighter, inexpensive core boxes can be used because hammering, crane handling and log chain damage is eliminated. Greenlee Core Machines can help you produce better cores faster, more economically.

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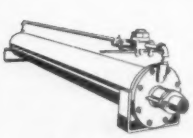
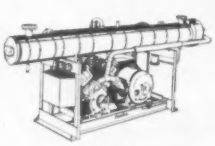
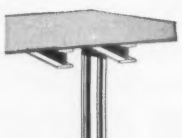


Air Cylinders



Packaged Liquid Chiller

Air Hoists



Lifting Platforms

and recommended the development of a society research laboratory. In conclusion he stressed the importance of industry's using the valuable material developed through important society research.

George K. Dreher, market development director of the society, discussed some of the competitive factors in the steel castings market and indicated how the users and potential users of steel castings need to be sold. He stated that the greater the number of people having a favorable impression of steel castings, the easier it will be to develop an increasing share of the metal goods market. There is no short-range gimmick that will do the job.

Metallurgical and technical achievements in the production of steel castings are a vital part of the marketing climate. Developments now known or still under wraps should add greatly to the marketing ammunition for the industry. Mr. Dreher stated that the potential of the steel castings industry is terrific.

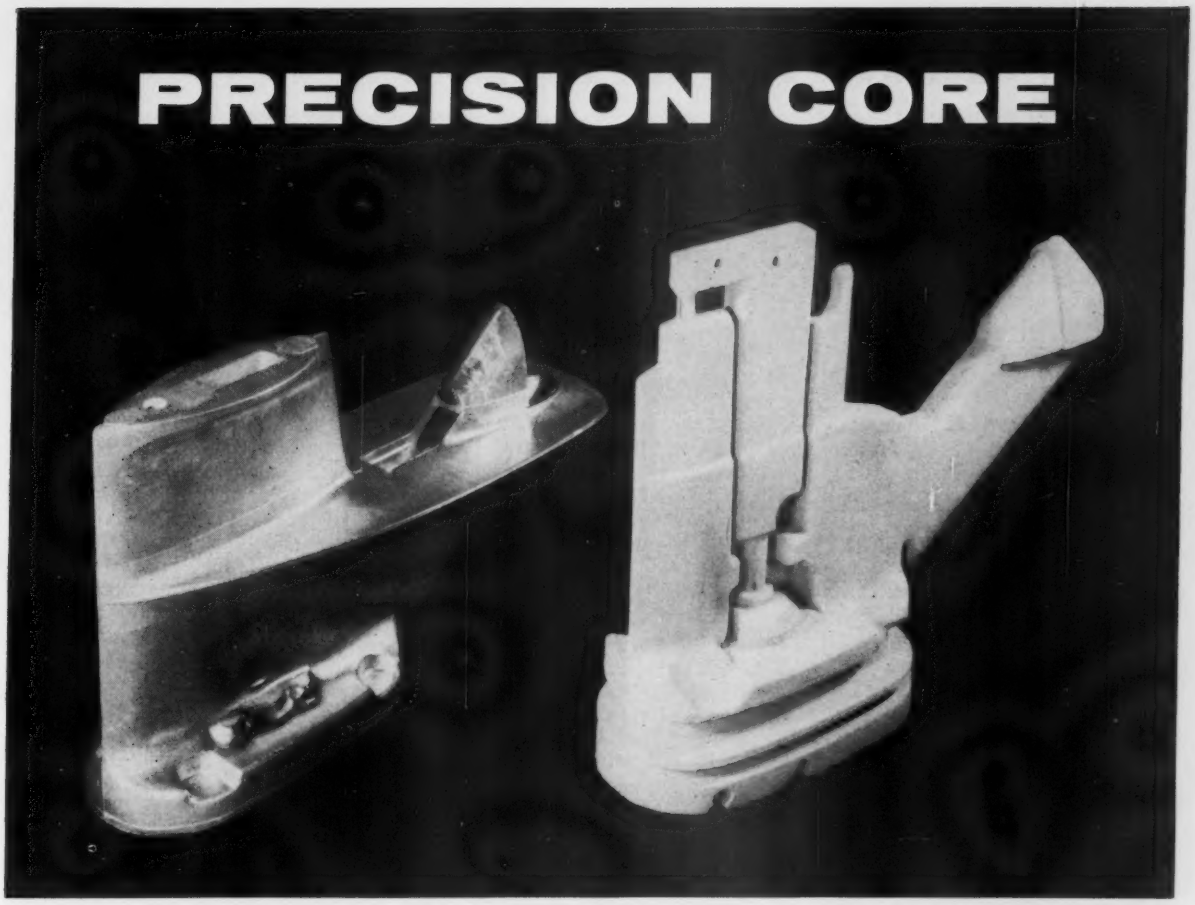
A. J. McDonald, Washington representative of the society, gave details on a steel castings conference scheduled for Fort Belvoir, Va., April 15-17. An excellent program built around all phases of design, selection, procurement, and use of carbon, low-alloy, and high-alloy steel castings has been arranged by the SFSA, the Alloy Casting Institute, and the Investment Casting Institute. R. A. Gezelius, assistant vice president, General Steel Castings Corp., Eddystone, Pa., and chairman of the SFSA Product and Market Development Committee, is chairman of the Industry Steering Committee for the conference.

Senator Karl E. Mundt of South Dakota, speaking on "What Lies Ahead in Labor Legislation," pleaded with business to take a more active part in politics. Unless businessmen participate in elections and see that the right people are elected to office, somebody else will.

The speaker said that unions are here to stay, that union leaders have been gaining in authority, and that unions have been gaining in power more rapidly than they have been willing to accept responsibility. Present legislation is woefully inadequate to meet the problems imposed by the growth of power.

An inspirational talk by Fred Smith, management consultant, Fred Smith & Associates, Cincinnati, on "How To Quarterback the Team," and an interesting discussion of "Power Development" by J. B. Thomas, president, Texas Electric Service Co., Fort Worth, Tex., completed the program.

PRECISION CORE



Casting and core for upper gear housing of outboard motor.

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The CO_2 process insures accuracy and dimensional stability. At the same time, it saves money by reducing labor costs and by eliminating the risks involved in baking and handling.

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Industry Briefs

General Steel Castings Corp., Granite City, Ill., will complete a three-year program of expansion and modernization this year with an expenditure planned to be $2 million. General Steel also has plants at Eddystone and Avonmore, Pa.

Fisher & Son Ltd., Hamilton, Ont., a nonferrous jobbing foundry, has been sold to John B. McColl and Thomas E. Lange, of Hamilton. Messrs. McColl and Lange also own the former plant of A. H. Tallman Bronze Co. on Cavell Avenue, Hamilton, which they bought last year. Each company will be operated as a separate organization.

Johnson Brass & Machine Foundry Inc., 270 North Mill St., Saukville, Wis., has been incorporated by Leland Johnson and Mark Johnson of Milwaukee.

Faunt Foundry Co., 8524 Vincennes Ave., Chicago 20, was formed recently to produce brass, bronze, and copper castings. Chester K. Faunt is president and treasurer. Thomas J. Doyle is vice president and secretary and Rudolf Buchhass is superintendent. The foundry will make a general line of castings, specializing in larger castings.

Metal & Thermit Corp., New York, is celebrating its 50th anniversary this year. Starting originally as the Goldschmidt Detinning Co., the company later branched into numerous other fields, including metals and chemicals production, mining, electroplating, arc welding equipment and supplies, and organic coatings.

Wm. P. Laytham & Sons Co., Paterson, N. J., has changed its name to Laytham Foundry Inc. No other change is involved.

Allied Chemical & Dye Corp., New York, has changed its name to Allied Chemical Corp. The change is being made to reflect the nature of the company's operations more clearly.

Quaker Rubber Div., H. K. Porter Co., Philadelphia, has appointed two Texas firms to distribute its industrial rubber products. They are F. W. Heitman Co., 1417 Kress St., Houston, for the Harris County area, and the Jess McNeel Machinery Corp., 2215 N.W. Loop 13, San Antonio, for the San Antonio, Austin, West Texas, and Rio Grande Valley areas.

Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich., has purchased Lift Truck Rental Corp., New York, for $2,300,000 and has formed a new subsidiary, Clark Rental Corp. The subsidiary will rent fork lift trucks and other material handling equipment in metropolitan New York, northern New Jersey, and Connecticut. Assets purchased include 550 fork trucks.

N. Y. Foundry Inc., New City, N. Y., has been granted a charter of incorporation listing capital stock of 200 shares of no par value. Directors are Edith Bersson, Joseph Donn, and Abraham LeMel, all situated at Main Street and Congers Road, New City.

Allison Div. and **Campbell Machine Div.** of American Chain & Cable Co. Inc., Bridgeport, Conn. have merged. The new name is Allison-Campbell Div. Allison is a manufacturer of abrasive cutting wheels and Campbell builds abrasive cutting machines.

Thermal Research & Engineering Corp., Conshohocken, Pa., has appointed two new sales agencies for its combustion and fired heat equipment. Paul H. Chapman & Associates will handle Florida, Georgia, Alabama, Tennessee, and the Carolinas out of offices in Elizabethton and Chattanooga, Tenn., and Atlanta Cooper Engineering Co. will handle northern California from its office in San Francisco.

Isochem Corp., Providence, R. I., has formed a new affiliate, the Isochem Resins Corp., to produce specialized formulations in the fields of epoxy, polyester, and allied resins.

Key Products Co., 1530 Junction Ave., Racine, Wis., has been incorporated to manufacture core oils, paste, foundry supplies, soaps and

INTEGRATES FACILITIES: American Smelting & Refining Co. has just completed a major addition to its Corpus Christi, Tex., refinery to handle production of the entire range of zinc alloys distributed by its Federated Metals Div. The integration of refining and alloying facilities permits shipping from Corpus Christi direct to the users or to the division's plants or warehouses. Workmen are shown readying the first shipment of die cast bars

A NEAT TRICK...

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we guarantee it with the

Blastcrete Gun

Hundreds of foundries all over the country . . . from the smallest to the largest . . . have eliminated the use of block and brick. This is accomplished by using a BLASTCRETE gun which shoots denser linings, faster (usually ⅓ the time of other type guns). The Blastcrete gun's ability to handle extremely damp materials (such as rebounds) is only one of its many outstanding features. So superior is the BLASTCRETE GUN that more and more companies have discarded the gun formerly used after a FREE trial run with this outstanding refractory gun in their own cupolas.

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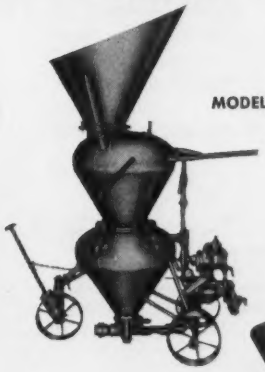
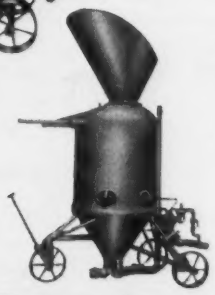
Find out why hundreds of companies have replaced their air placement gun with Blastcrete.



MODEL PM-1



MODEL BG-8-A

FREE TRIAL PROVES SUPERIORITY

A BLASTCRETE gun will be installed FREE in your plant on a NO OBLIGATION basis. Simply compare it with your present method or gun. Afterwards decide for yourself! Buy it or rent it . . . either way you'll want a BLASTCRETE!

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Many foundries choose the BLASTCRETE Rental Plan because the gun is used in the maintenance and repair of furnaces, ladles, etc., and can be written off as business expense.

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THE PATENTED BLASTCRETE ANGLE NOZZLE

Developed for use in small cupolas, ladles, electric and reverberatory furnaces, is adaptable to any air placement gun (fits any size hose) and is available at the extremely low cost of **$55.00**

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HOW TO DO IT

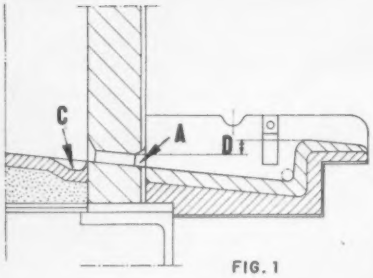
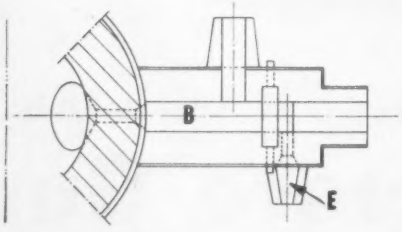


FIG. 1



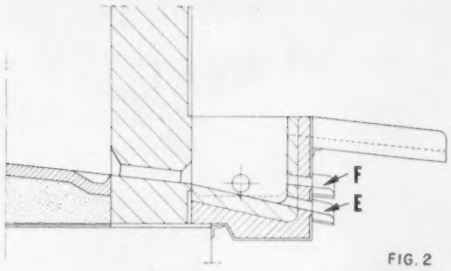
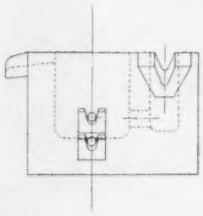
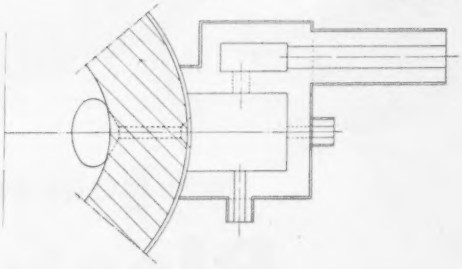


FIG. 2





New Self-Slagging Spout Design Facilitates Tapping of a Cupola

By LUCIANO GABRIELLI
Director of Production
Fonderie E Officine San Giorgio Pra
Genoa, Italy

SELF-SLAGGING cupola spouts sometimes present difficulties, usually at the start of the melt. One method of operation consists of lightly plugging tap hole A, shown in Fig. 1, turning on the wind until a certain amount of molten metal is collected in the cupola well, then tapping it. The self-slagging spout begins to function at the moment of tapping. This method of operation could be dangerous if more than a normal amount of iron accumulates in the well and escapes under pressure when the tap hole is opened. Also, the limited size of collecting basin B makes tapping rather difficult.

The other method of operation consists of turning on the wind without plugging the tap hole. The first, cold iron will collect in depression C in the well, and the iron immediately following will run out of hole E, preheating the tap hole and collecting basin. When hole E is closed, iron will rise in the basin until the slagging system begins to function regularly. The possible problem in this method of tapping is that a piece of coke might block the tap hole and prevent the first iron from running out, resulting in a freeze-up. Use of an oxygen lance often is difficult because of limited accessibility to the tap hole.

Most of these difficulties are overcome with the self-slagging spout shown in Fig. 2. This spout has a separate molten metal basin disposed laterally from the slag and iron collecting basin. Hole E in the side of the slag and iron collecting basin opposite the tap hole permits heating of the tap hole and basin at beginning of the melt and draining of iron and slag at the end of the melt. Another hole, F, can be placed above hole E and in line with the tap hole to permit an oxygen lance to be inserted to reach the tap hole if it should freeze up.

Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $15 for each idea submitted and published. Send a photo or drawing with your idea

other products. Incorporators are Gregory T. Haas, Fred Venturelli, and G. Paul Beardsley of Racine.

American MonoRail Co., Cleveland, has purchased Tipp Mfg. Co., Tipp City, Ohio, thereby adding a low-cost overhead cable conveyor to its line of products. The conveyor line will be marketed under the name American Cable-Way Conveyor. Carl L. Sheets and Joe Kohoot have been named manager and assistant manager, respectively, of the Conveyor Div.

Hyster Co., Portland, Oreg., has acquired Martin Machine Co., Kewanee, Ill., and has become a Nevada corporation. The corporate change will not affect operation or location of the present factories or offices, nor will it involve any other changes.

Electro Refractories & Abrasives Corp., Buffalo, has appointed Strong, Carlisle & Hammond, 1392 W. Third St., Cleveland, to distribute its crucibles and furnace refractories within a 125-mile radius.

W. E. Mushett Co., San Francisco, will distribute the company's grinding wheels in the Bay area.

Wilshire Power Sweeper Co., Elgin, Ill., and Glendale, Calif., has appointed Columbia Floor Equipment Co., Glendale, Calif., as its southern California distributor.

Metal Treating Institute reports national billings of member company commercial heat treaters totaled $2,326,400 in February, off nearly 28 per cent from a year ago.

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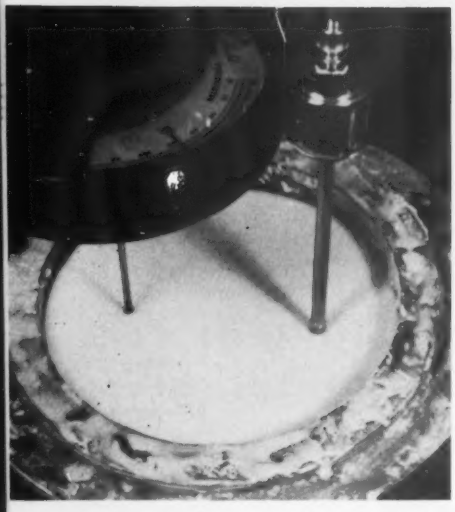

Fig. 1—Measuring slurry viscosity. Left, Brookfield viscosimeter spindle shaft. Right, stirring shaft

Fig. 2—Measuring slurry viscosity with a Zahn viscosimeter, at left. Stirring shaft again is at right

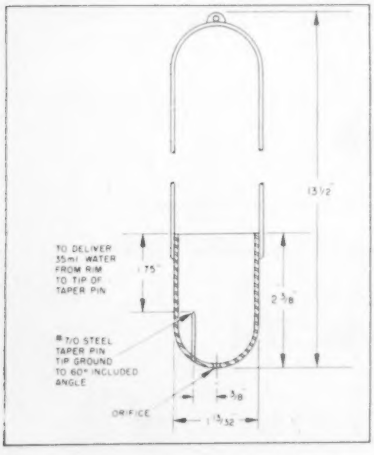

Fig. 3—Drawing shows cross section of modified Zahn viscosimeter

Viscosity Measurements for Thick Slurries

By **DONALD J. KENNY, Ph. D.**
Assistant Professor
Dept. of Chemistry

and **PAUL A. RUTT**
Research Engineer
Research Institute of Science and Engineering
University of Detroit
Detroit

DURING a study of variables in the precoating materials used in producing investment castings for Springfield Armory, it became necessary to develop a standard method for measuring the viscosity of thick slurries.

The viscosity measurement of a precoating mixture presents several problems imposed by the unusual characteristics of this type of suspension. It is difficult to use a dynamometer type of meter such as the Brookfield viscosimeter[1] because of the tendency of particles in the suspension to settle quickly when not agitated. Constant stirring must be maintained, and the motion thus imparted to the slurry adversely affects torque measurements made by the viscosimeter.

On the other hand, efflux viscosimeters also are handicapped by a combination of the settling and coating tendencies of the slurry. The actual orifice opening may vary because it becomes coated or clogged with settling particles.

The Brookfield Viscosimeter — The Brookfield synchro-lectric viscosimeter is a direct-reading, immersion-type instrument. The principle on which it operates is measurement of the drag produced on a spindle rotating at a definite, constant speed while immersed in the material under test. This drag is indicated on a rotating dial by a pointer attached to the spindle shaft. The pointer indicates the tension produced on a spiral spring, the core of which is fastened to the spindle shaft. The outside coil terminal to the dial is directly connected to the motor shaft. A clutch engaged by a control lever maintains the pointer position when the motor is stopped to facilitate reading. Twenty-eight effective viscosity ranges, covering the approximate range from 0 to 2 million centipoises, are available through various combinations of spindle speeds and interchangeable spindles.

In measuring the viscosity of precoat slurries, the viscosimeter was immersed to the line on the No. 3 spindle, diametrically opposite the stirrer, as shown in Fig. 1. In general, the Brookfield viscosimeter gave reasonable results in the same batch, and its sensitivity was good. It was very difficult to use, however, and it was impossible to achieve absolute correlation between batches. This viscosimeter is very sensitive to position, with respect to the stirrer, and to the rate of stirring. If these variables are held constant, however, good results can be obtained with it in individual batches, although, as noted before, there is little correlation between different batches.

Because of these limitations, this instrument cannot be used to compare the characteristics of different mixtures. It can, however, be used to calibrate an efflux-type viscosimeter in each precoat mixture and thus obtain an absolute relation between viscosity of different mixtures.

The Zahn Viscosimeter — The Zahn viscosimeter[2] is an efflux-type meter regularly supplied in five sizes, differing only in the diameter of the calibrated orifice. The set of five covers a range of approximately 20 to 2000 centipoises. The viscosity of a liquid measured by the Zahn viscosimeter is expressed in Zahn seconds. That is the time required for a definite volume (44 cu in.) of liquid to flow through a precision-drilled orifice in the bottom of a bullet-shaped, corrosion-resistant, stainless steel cup (see Fig. 2). The viscosimeter is held in a vertical position, dipped into the liquid being tested, then lifted out. The time of efflux is reckoned from the moment the top edge of the viscosimeter cup breaks the surface until steady flow from the orifice stops.

A general correlation between Zahn seconds and other viscosity units has been published by the Dallas Paint and Varnish Produc-

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Foundry sand engineers of the Illinois Clay Products Company, located in offices shown in the map, are available on request to supervise installations and trial demonstrations.

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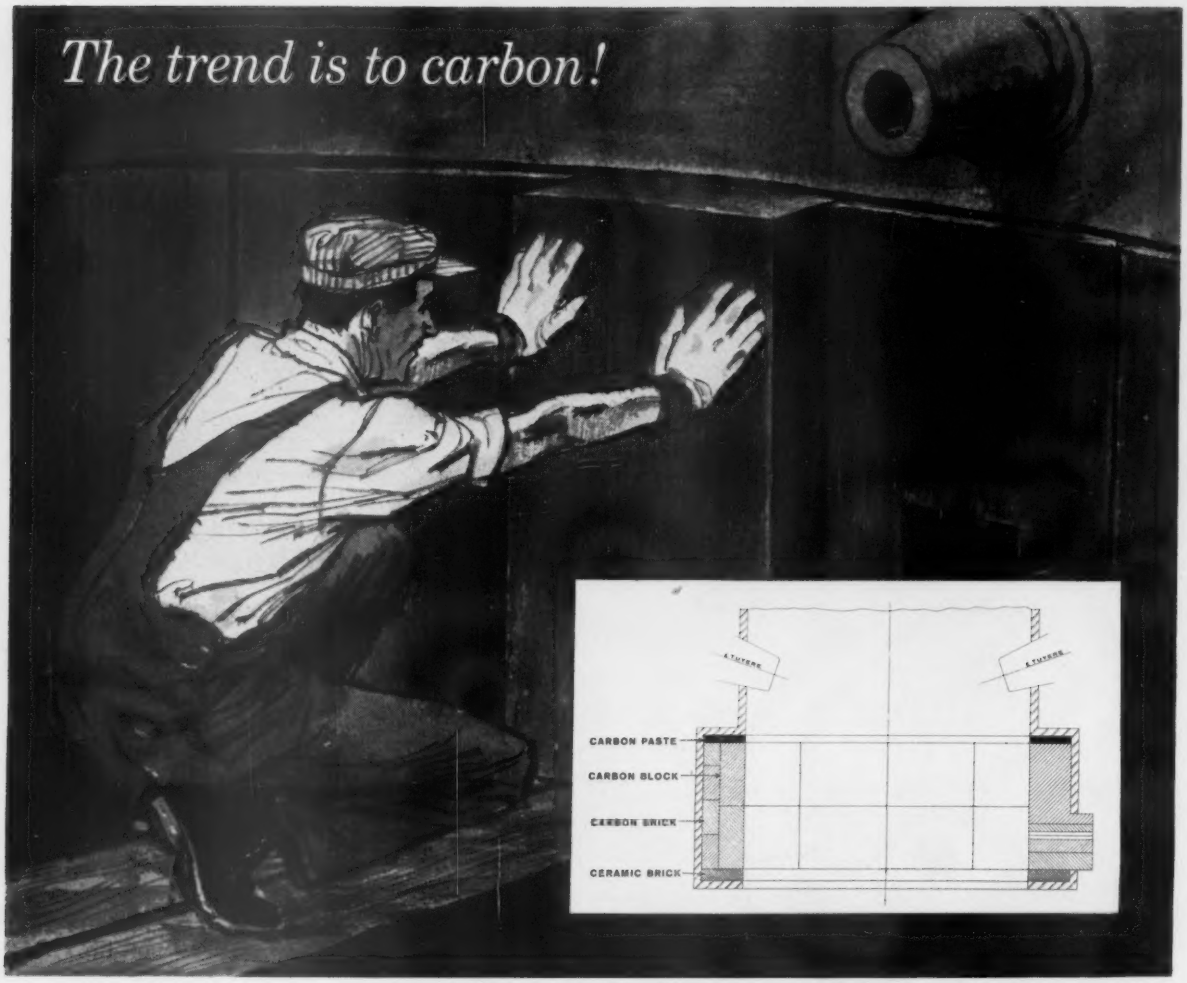

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Due to its unusual and highly desirable physical characteristics, the trend today is to "National" carbon refractories for cupola construction. Its resistance to attack from either acid or basic slag, low co-efficient of thermal expansion, and high strength at elevated temperatures, make "National" carbon ideal for lining cupola wells, tap holes and slagging troughs.

This material is available from stock in various sizes up to 24″ x 30″ x 108″ long and in standard brick shapes, ramming paste and carbonaceous cements. Fabricated furnace-liner sections and blocks, as illustrated, provide minimum joint construction. National Carbon Company has the facilities and experience to machine close tolerance pieces to your specifications.

Wherever your foundry operations call for a refractory material – from light-off to casting – it will pay big dividends to specify "National" carbon and graphite products.

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tion Club and is available.[3] The manufacturer of the Zahn instrument warns, however, that all liquids do not have the same flow characteristics with respect to the surface of the cup, even though they may have the same viscosity. It is wise, therefore, to calibrate the Zahn for the particular fluid tested or to use it as a relative index of viscosity, as was done in this laboratory.

It was impossible to use the usual form of the Zahn viscosimeter because of difficulty in judging the moment to stop timing. A simple modification improved the sharpness of the cutoff point considerably. This modification consisted of the insertion of a fishhook type of device. Timing was stopped when the point of the hook broke the surface. Rough estimation of the probable error for this device was about 3 or 4 per cent, even with poor technique. When this temporary arrangement was found satisfactory, a permanent modification was made in the Zahn cup. Details are shown in Fig. 3.

References

1. Brookfield Engineering Laboratories Inc., 243 Cushing, Stoughton, Mass.
2. General Electric Co., Instrument Dept., West Lynn, Mass.
3. "Viscosity Conversion Chart," published by the Federation of Paint and Varnish Production Clubs, 121 South Broad St., Philadelphia 7, Pa.

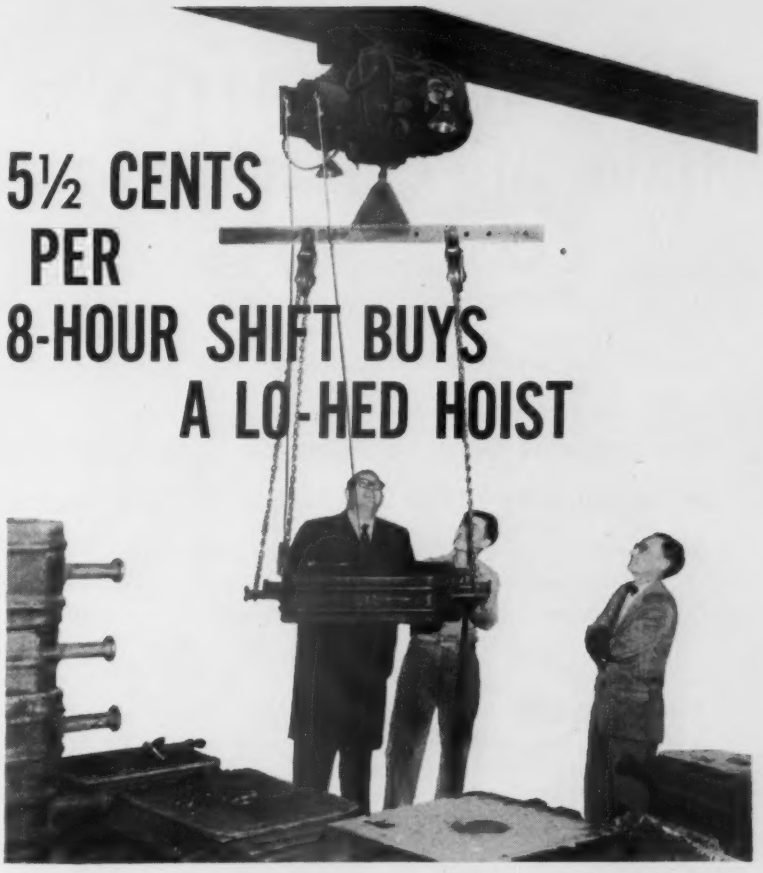
Foreign Technical Information To Flow from Clearing House

A central clearing house for the collection and dissemination of technical information from abroad is to be set up within the Department of Commerce by its Office of Technical Services.

At present no central agency in the government is responsible for gathering foreign technological, scientific, and engineering information for the purpose of making it available to American scientists, research institutions, and the public. When the new Foreign Technical Information Center is operating, it is estimated that 50,000 abstracts and 10,000 complete translations will be prepared and released annually.

A staff of engineer-translators will be set up to review and analyze foreign publications and select those of greatest value. A scientific advisory committee will assist in the selection. Among the materials the engineer-translators will receive are copies of 200 important Russian scientific journals.

The new Center will operate a co-ordination service to eliminate duplication of translations by U. S. agencies and allies.



5½ CENTS PER 8-HOUR SHIFT BUYS A LO-HED HOIST

Ed. Boyer, Sales Manager of American Engineering Company's Materials Handling Division, inspects 26-year-old Lo-Hed hoist with James Gift, Molder, and Russell Miller, Purchasing Agent for Dodge Steel Company, Philadelphia, Mr. Miller writes:

"When you first asked if we still had this hoist in use, we were tempted to say no without checking because (1) we like to think our plant is too modern to have anything in it over 26 years old, and (2) it seemed impossible for a hoist to hold together over 26 years in our type of service.

"Therefore, the fact that this hoist is still very much in use in our plant today indicates that it is still considered modern in design and efficient in operation.

"Moreover, as repair part purchases have been very low, it would seem that this hoist still has many more years of useful life left in it."

Lo-Hed Electric Hoists cost less because they last longer

Based on current prices, this Lo-Hed Hoist at Dodge Steel shows a capital cost of less than 5½ cents per 8-hour shift . . . and it looks good for another 26 years of valuable service.

Just give us the details—there's a Lo-Hed exactly right for your job

Lo-Hed's are available with headrooms as low as 11"; capacities ¼ to 12 tons; all control types, two-speed included; 5 suspensions; shrouded bottom block; 2 automatic brakes; anti-friction bearings throughout. They're full load tested, and adaptable to any crane or monorail system. Look in your classified telephone directory under "A-E Lo-Hed Hoists" for your nearest representative.

For helpful information on hoists, fill out and mail this coupon today.

Please send me a copy of your booklet on:

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DISTRIBUTORS AND AGENTS: Distributorships and agencies for Lo-Hed Electric Hoists are available in many parts of the country. If you are interested, call or write Ed Boyer, Sales Manager, A-E's Materials Handling Division.

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Even the smallest-size Heroults have big electric furnace features!

Now, while you've got time to catch your breath, is a good time to take a searching look at your foundry facilities. In the face of the obviously keener competitive period ahead, wouldn't you be smart to modernize your melting equipment—to switch to electric furnaces—and be ready for the business upturn that's coming? *You can install a Heroult now with minimum inconvenience to plant operations.*

The Heroult Electric Furnace helps you produce better-quality steel . . . faster . . . and more economically

Available in standard sizes of shell diameter ranging from 7′0″ on up, and with capacities of from 1½ tons up to 200 tons, the improved Heroult is unquestionably the finest electric melting furnace on the market. The features listed below are found in all standard Heroult's—even the smallest.

The Heroult Furnace is 100% mechanically operated.

It includes such mechanical features as: heavy rack-and-pinion-type tilting mechanism; mechanical roof lift; motor-driven, rotating, jib-type roof swing; winch-operated, water-cooled jib-type door-lifting mechanism; and high-speed, electro-mechanical electrode-positioning mechanism.

Another exclusive—cage-type shell construction with shell plates clipped to a heavy supporting structure. This construction minimizes shell warping and allows easy replacement if shell plates are damaged.

Exclusive—Operating Mechanism Independently Supported.

The tilting platform on which all operating mechanisms are supported is attached directly to the rockers independent of the shell structure. Thus operating mechanisms are unaffected by any shell distortion.

Exclusive—Flat-Bottom Shell.

This feature facilitates easy shell relining and provides maximum protection against burnouts. Thicker refractory at the sides of the hearth promotes more uniform bath temperature.

Exclusive—Water-Cooled, Skew-Back Roof Ring.

This feature eliminates the need for special skew-shaped roof refractories.

Electrode Mast Safety Device.

This spring-loaded, rack-and-pawl-type device provides positive protection against damage resulting from electrode-winch cable breakage.

Square-Sectioned, Water-Cooled Electrode Mast Arms.

This design guarantees a rigid connection between mast and mast arm, thus helping to maintain proper electrode position and alignment.

Remote-Controlled Electrode Clamps.

This device, of the spring-clamp, air-release type, is located inside of the rear section of the water-cooled mast arm where heat cannot affect it.

Square-Sectioned Electrode Mast.

This design feature, developed by American Bridge, assures proper guiding and electrode positioning.

Rockers.

The heavy fabricated steel curved top and bottom rockers minimize forward travel during tilting. The furnace will return to charge position from any degree of tilt due to designed center of gravity.

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American Bridge Division
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Please send me a copy of the latest Heroult Electric Furnace catalog ☐ and/or folder showing large drawing with special installation and engineering data ☐.

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Foundry Developments

By EDWIN BREMER
Metallurgical Editor

INTERESTING communication from Toshio Suezawa, Osaka, Japan, reports application of rare earth additions to high-silicon (14 per cent) iron castings used for corrosion-resistant purposes. This iron is characterized by its brittleness at room temperature, but a ladle addition of 30 to 60 grams per ton (0.003 to 0.006 per cent) of cerium mischmetal provided ductility as indicated by dropping a thin specimen about 0.118 in. thick and 1 in. sq from a height of 5 ft which did not fracture while a similar untreated specimen fractured readily.

Experiments were conducted in the foundry of Kyodo Kikai Seisakusho (Union Machine Mfg. Co.), producer of pumps and pump parts in high-silicon, stainless steel, and gray iron. The high-silicon iron has a composition of 14.3 to 15.2 per cent Si, 0.4 to 0.6 per cent Mn, 0.08 per cent S, 0.1 per cent P, and 0.5 to 0.7 per cent TC.

Reveals Grain Size

NEW oxidizing method for revealing austenitic grain is described by Imai and Hirotani in *Science Reports*, Vol. 9, No. 6, Research Institutes, Tohoku University, Sendai, Japan, and is reported to be technically simple to accomplish and quite reliable for examining austenitic grains in steel. Procedure is to heat polished specimen in high vacuum at austenitizing temperature for a suitable time, then oxidize for 3 to 5 seconds by admitting air into the furnace. Specimen is put in molten borax bath heated at 900 to 950° C, stirred for 30 to 45 seconds, then quenched in water to remove borax film. After washing and drying, specimen is examined microscopically.

Cast Die Steel

NEW cast steel for dies developed by American Foundry & Machine Division, Eimco Corp., Salt Lake City, is reported to have good galling resistance. Termed "Utaloy Die Steel," the material is said to have a consistent critical hardness of R_c60-62, achieved through a special tempering process.

The new steel is claimed to overcome the principal limitation to cast steel as a die material through alloying and heat treatment to produce the necessary gall resistance. Successful continuous use for certain dies and punches is said to prove that the new steel can replace expensive forged steel in many applications.

Cathodic Protection

RECENTLY completed study at National Bureau of Standards shows the electric potential needed to protect steel cathodically from corrosion in salt water. The best degree of protection was achieved when the specimens were held at minus 0.77 v with reference to a saturated calomel electrode. The data obtained under laboratory conditions are expected to provide a basis for handling similar problems encountered under marine conditions. Details are available in a report by W. J. Schwerdtfeger in *Journal of Research*, National Bureau of Standards, No. 3, 1958. This investigation is designated RP 2833.

Zinc-free bronze, 5000-lb pump casing being prepared for steam leakage test at National Bearing Div., American Brake Shoe Co., Meadville, Pa. It is an 18-in. suction pump for handling sea water

Selenium Alloy

SPECIAL nickel-selenium alloy for use in production of selenium-containing stainless steels is being produced at the Baltimore plant, American Smelting & Refining Co. Selenium content of the new alloy averages 57 per cent, and is said to act as a degasifying agent and to improve the machinability of the stainless steel. Material is available in chunks with a maximum diameter of 4 in. Firm is reported to have several other selenium alloys under development, and will continue to produce ferroselenium containing 50 to 58 per cent selenium.

Titanium and Its Alloys

SUMMARY of information in the literature on physical properties of titanium and its alloys is presented in a report obtainable from the Office of Technical Services, U. S. Department of Commerce, Washington 25. Where information was sufficient, evaluation of published results was made so that the most accurate value for properties could be indicated. Report is designated PB 121629, and titled *The Physical Properties of Titanium and Titanium Alloys* by W. J. Lepkowski and J. W. Holladay. Price is $2.25.

Ultrasonic Testing

DATA which provide assistance in setting up reference standards for ultrasonic testing of various alloys is presented in "Research and Development Leading to the Establishment of Ultrasonic Standards for Aircraft Materials" by A. D. Guinn, R. D. McKown, J. C. Folz and W. C. Hitt. Designated PB 131564 the report is available from the Office of Technical Services, U. S. Department of Commerce, Washington 25, for $3.50. Information was compiled from determination of signal response variables which may be caused by manufacturing methods, heat treatment, grain flow, etc.

Circle 674 on Page 51→

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  Birmingham, Ala.
- **Combustion Engineering, Inc.**
  Chattanooga, Tenn.
- **Crane Co.**
  Chicago and Chattanooga
- **Dalton Foundries, Inc.**
  Warsaw, Ind.
- **Dayton Malleable Iron Co. (3 plants)**
  Dayton, O.
- **Der Stahl- und Temperguss A. G.**
  Traisen, Austria
- **Electric Steel Foundry Company**
  Portland, Ore.
- **Erie Malleable Iron Company**
  Erie, Pa.
- **Fahralloy Canada Limited**
  Orillia, Ont.
- **Fairbanks, Morse & Co.**
  Kansas City, Kan.
- **Federal Malleable Co.**
  Milwaukee, Wisc.
- **General Steel Castings Corp.**
  Eddystone, Pa.
- **Goetzewerke A/G**
  Burscheid, Germany
- **Hammond Brass Works**
  Hammond, Ind.
- **Haynes Stellite Company**
  Kokomo, Ind.
- **Moline Malleable Iron Company**
  St. Charles, Ill.
- **Mueller Co.**
  Decatur, Ill.
- **National Roll & Steel Foundry Co.**
  Avonmore, Pa.
- **Ohio Injector Co.**
  Wadsworth, Ohio
- **Pittsburgh Steel Foundry Corporation**
  Glassport, Pa.
- **Sibley Machine & Foundry Corporation**
  South Bend, Ind.
- **Spojene Tovarny Na Obrabeci Stroje**
  Brno, Czechoslovakia
- **Stavanger Electro-Staalverk A/S**
  Jorpeland, Norway
- **Stockey & Schmitz**
  Gevelsberg, Germany
- **Stockham Valves & Fittings**
  Birmingham, Ala.
- **Sulzer Bros. Ltd.**
  Winterthur, Switzerland
- **Superior Steel & Malleable Castings Co.**
  Benton Harbor, Mich.
- **Universal Castings Corporation**
  Chicago, Ill.
- **Wagner Malleable Iron Company**
  Decatur, Ill.
- **Walworth Company**
  Kewanee, Ill. and Boston, Mass.
- **Woodruff & Edwards, Inc.**
  Elgin, Ill.
- **Worthington Corporation**
  Harrison, N. J.

Lester B. Knight & Associates, Inc. has successfully
ranging
layout

Foundry Mechanization

The degree and type of mechanization should be established for each requirement. The simplest unit of rugged design and construction to insure minimum maintenance is a must. Over-mechanization should be avoided.

Automation

Automation can and must be applied in foundries to the degree justified by the particular problem. Knight engineered the first fully automated unit producing 272 molds per hour, 16 hours per day. Many other operations have been established on semi and fully automated cycles. Each problem is a study in itself to establish its economic justification.

Materials Handling

By proper plant layout and handling methods, manual handling has been reduced to a minimum. The ideal, of course, is to perform an operation on the material each time it is handled. In the foundry from 100 to 400 tons of material are handled to ship 1 ton of castings.

Foundry Management

Knight has reorganized, refinanced and operated foundry businesses successfully and has temporarily directed operations in one or more departments for short periods to establish low cost operations.

Foundry Organization

Knight has established simple organization programs pinpointing responsibility and authority, providing proper communication between various functions and, of course, providing complete administrative and procedure manuals to make certain that all personnel are familiar with policies and each knows and understands his job.

Foundry Engineering

Complete surveys of plants to establish the basic requirements for modern, low-cost operation. Knight Engineers become, temporarily, a part of the client's organization to make a comprehensive, objective analysis and, with the client's staff, develop the most modern methods and facilities. The result of the combined effort always is a better solution than either group could develop separately.

Architectural Engineering

Undivided responsibility, from drawing board to completed plant, has insured savings in time and money. Knight experience has helped to improve working conditions in a simple, functional plant designed for foundry operation. Knight has a complete and experienced mechanical, electrical, structural and architectural staff who have supervised the design of hundreds of millions of dollars of industrial plants.

completed more than 350 foundry engineering assignments . . .

from the solution of a single problem in one department to the design and supervision of construction of complete new plants.

In many instances, we have assisted the client to modernize methods and facilities, then established the new organization and procedures for adequate control (including cost control), and new incentives based on the work content of the job.

Construction Management

After plans have been approved, Knight has acted as the client's representative to supervise construction at minimum cost. This service has included supervision of "cost-plus" as well as fixed price contracts. The saving in time and money is far greater than the cost of complete construction management service.

Foundry Modernization

Modern methods, facilities, controls, sales methods, rigging and operating techniques can and must be used by all sizes and types of foundries to insure low cost, profitable operations with high take home pay, low unit costs and adequate return to management and owners.

Industrial Engineering

These services have included establishment of standards for incentive wage payment plans to insure a full day's work for a full day's pay, labor contract negotiations, establishment of basic data for estimating, cost and labor control, preventive maintenance programs and plant layout, protection and service.

Methods

Knight engineers have completed analyses of methods to reduce time and motion to a minimum and to establish the most efficient rigging to permit full utilization of existing personnel and equipment. A method study should always be tied in with establishment of incentive wage plans.

Cost Controls & Budgets

The Knight organization has installed cost systems in more than 100 manufacturing plants, including foundries, to establish better and simple controls, "highlight" inefficiencies and establish budget goals for all levels of supervision and management. Every foundry must know its costs to insure continued profitable operation, competitively. A periodic review or audit by Knight Engineers insures that this "tool" of management is kept up to date.

Production Control

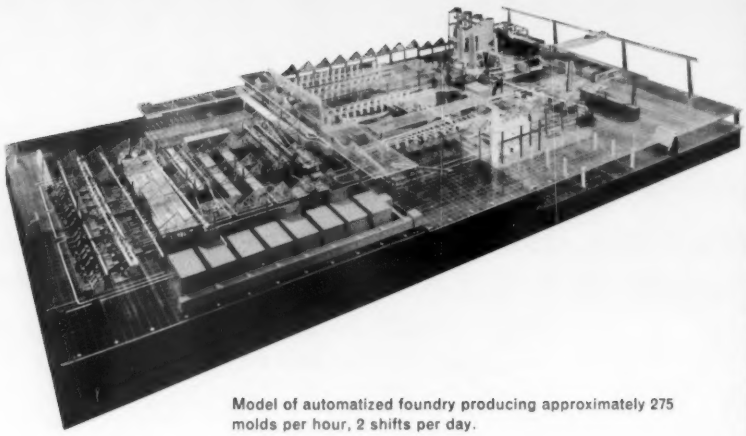
Delivery promises always are important and sometimes critical. Systematic production scheduling and control based on known factors requires a minimum of people and insures a minimum of missed shipping dates.

Surveys

Knight-engineered audits of operations can assist you to establish the changes necessary to secure maximum utilization of facilities and manpower—and thus maintain the most efficient, low-cost operation.

Marketing

Knight has surveyed markets to establish the availability of work suitable for a particular foundry and to determine the type of facilities to be established for the available work.



Model of automatized foundry producing approximately 275 molds per hour, 2 shifts per day.

Knight Organization

The key men in Lester B. Knight & Associates, Inc. have from 10 to 25 or more years of successful experience in some phase of foundry management, production, engineering or equipment. The coordination of each man's specialized experience enables the Knight organization to give foundry management reliable, practical assistance on virtually all foundry problems.

The Knight organization has completed more than 350 successful assignments in every type of foundry—grey iron, steel, malleable, brass and bronze, magnesium, and aluminum. These foundries are producing castings from a few ounces to 50 tons and from 1 to more than 1,500 tons of castings per day. Green sand, dry sand, cement, plaster, "shell" molds, permanent mold, centrifugal, die casting and investment casting operations all have been served by Knight.

Working closely with clients' staffs, Knight Engineers have assisted its clients to audit operations, define management functions, establish organization, modernize methods and facilities, and design complete new plants. They have successfully applied automation in varying degrees to a number of different types of foundries, and have assisted management to establish more economical procedures for the control of operations and costs.

EVIDENCE OF EXPERIENCE

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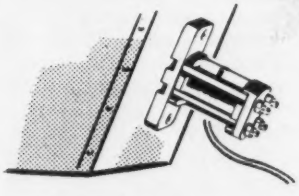

Write today for a complete catalog and price list.

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Circle 675 on Page 51

Thirst Is a Key Factor In Fatigue of Workers

Encouraging Water Intake Helps To Solve Problem

DESPITE rapid strides in mechanization of foundry techniques, worker fatigue still ranks as one of the critical factors in productivity. Whether a job consists of tapping a furnace or operating a cleaning machine, foundry work probably always will call for a certain amount of physical exertion, and extra fatigue situations such as overtime or hot weather thus pose real management problems.

What Is Fatigue?—What, exactly, is fatigue? Dr. Lucien Brouha, a specialist in industrial medicine at the Haskell Laboratory of Toxicology, has reported on an extensive study of the work output of men in "hot jobs." He concludes that one important reason for fatigue, in addition to the work itself, is failure of the body to get enough water during the working day. A man doing heavy work may lose as much as 12 quarts of water in 8 hours, most of it through sweat.

This finding is not exactly news in the foundry business, of course. The industry has long attempted to provide workers with the water they need on the job. Dr. Brouha's findings, suggest however, that a man's thirst is not a reliable indicator of the amount of water he needs to drink to avoid fatigue — that in fact it may be necessary for workers to "force" water even when thirst is not present and that this goal can be achieved by a relatively simple company educational effort.

It generally has been believed that the human body is a self-regulating mechanism which automatically demands the water it needs to make up losses due to muscular exertion. The laboratory's long and varied testing of many types of workers on many jobs showed that there is a time lag in thirst. This lag may set up a destructive fatigue cycle which cannot be broken until the end of the shift. In such an event, the worker leaves the job more tired than necessary, and he has been less efficient than he need have been for a good part of the day.

The Fatigue Cycle—The progressive fatigue cycle works like this: As the employee does his job, his muscular exertions produce heat which must be dissipated. His body perspires to cool off, and he loses moisture. (In hot weather he not

Circle 677 on Page 51→

WIDEST
APPLICATION

Whatever your cleaning job may be, there is a size and type of Malleabrasive shot or grit of a specialized hardness to do your job best.

Whether you use centrifugal or air-blast cleaning equipment—whether you want shot finish or grit finish—whether you clean steel, gray iron, malleable, bronze or aluminum, whether for cleaning before surface coating, enameling, metallizing, galvanizing, you can have in Malleabrasive the right type to do it best.

The full and complete Malleabrasive process—used by us exclusively—enables us to combine the toughness of malleable iron with various degrees of hardness to produce abrasive "tailored" to your special needs.

Our service personnel is available to consult with you without obligation. Write us.

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Designed by
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You'll find it pays to standardize on Acme melting pots and ingot molds. They reduce down time and replacement costs because they're cast from a special iron formula that combines strength with high temperature resistance. They improve quality and reduce rejects, too, because they're designed for even heat distribution without hot spots. If you melt any non-ferrous metals, take advantage of our more than 30 years' experience in this field. It's your assurance of consistent high quality in Acme melting pots and ingot molds . . . designed *by* foundrymen, *for* foundrymen.

Quick delivery anywhere in the United States. Write for size list showing 40 standard sizes.

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only produces more heat but the moisture evaporates quicker.) If water is not replaced in the body to permit more sweating, the worker's heartbeat is stepped up, and his temperature rises—it may even soar to over 100 degrees.

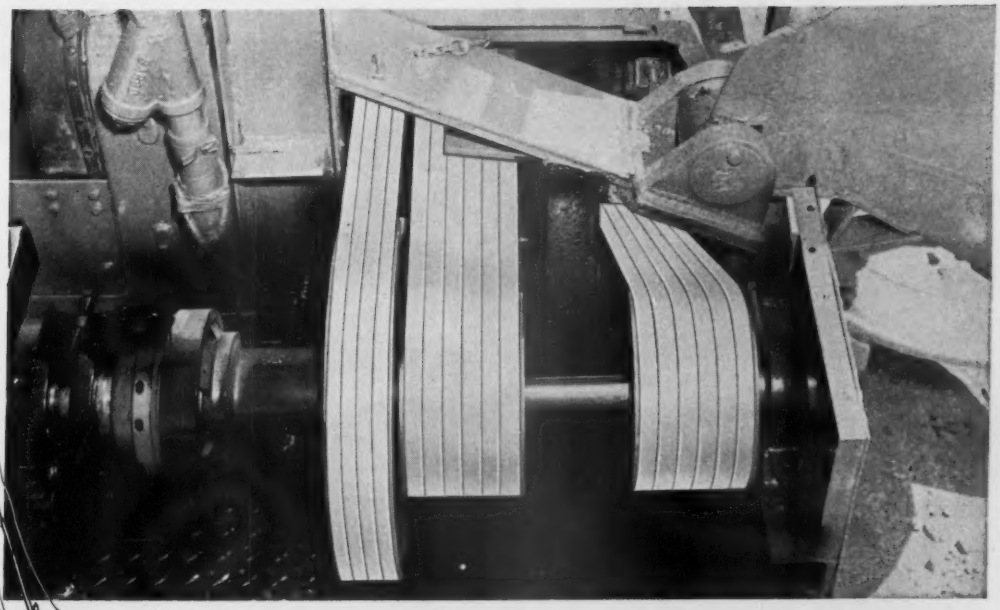
As the temperature rises, certain chemical reactions increase in the body, forcing the heart to pump blood faster to take care of them and in turn requiring the body to sweat more. Thus a worker who once falls behind on his water intake gets tired at an increasingly faster rate, no matter what work he's doing.

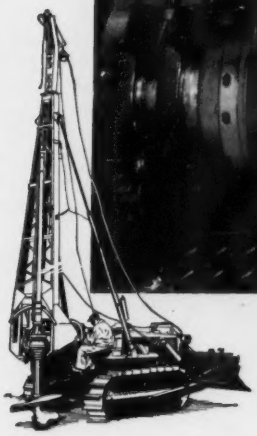
The problem of "invisible" thirst is present the year around, the testing discovered. Even in fairly cool weather, workers generally drink only about two-thirds of the water they need to keep pace with water loss.

Replacement of water lost during work cuts down buildup of fatigue

A Solution — The solution? A modest program for training workers to drink more water, Dr. Brouha says. "We have found that the best practical technique is to provide paper cups near each drinking fountain and to explain to employees that if they will drink a certain number of cups each day, they will leave work less tired. The number of cups can be determined experimentally by studying the average weight loss of the workers involved in various jobs. The men learn rapidly how to drink more water to compensate for their sweat loss, and a definite improvement in physiological reactions is seen."

An effort should be made to encourage the men to begin drinking water early in the shift before the fatigue cycle can set in, the doctor says. He points out that paper cups are preferable at the source of water both because they are sanitary and





Super V-Belts soak up shock ...cut maintenance costs 50%

No other V-Belt has ALL these advantages

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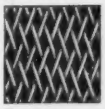
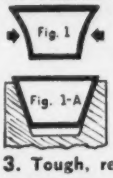


A Gates exclusive: provides greater flexibility . . . prolongs belt life . . . helps deliver more power to driven machine.

2. Concave Sidewalls (U. S. Pat. 1813698)



Note the concave sides shown in Fig. 1. As belt bends, concave sides become straight, making uniform contact with sheave groove (Fig. 1-A). Even contact means uniform wear . . . far longer belt life.

3. Tough, resilient Tensile Cords

Super strong and resilient; provide 40% greater horsepower capacity . . . easily absorb heavy shock loads . . . reduce number of belts required, save weight and space.

4. High Electrical Conductivity
Built into Gates Super Vulco Ropes for safer drives (in explosive atmosphere).

5. Oil, Heat, Weather Resistant
Made with special rubber compounds, Super Vulco Ropes stand up longer under all conditions.

ESPECIALLY DESIGNED to handle the heaviest shock loads, Gates Super Vulco Ropes insure lower replacement and lower maintenance costs.

For example: Sordoni Construction Co., Inc., Forty-Fort, Pa., had frequent trouble with the drive on their heavy-duty hole-digger and pole-setter when installing big 80-foot powerline poles.

Lambert Swingle, shop superintendent, and the nearby Gates Field Engineer designed the drive for the equipment shown here. Mr. Swingle says: "The Gates Super Vulco Rope Drive has been working perfectly since 1956, cutting maintenance costs 50%. Without Gates Ropes, we'd be down most of the time."

A wealth of drive data is quickly available to you. Simply call your nearby Gates distributor for a Gates V-Belt specialist. Stocks carried in industrial centers around the world.

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World's Largest Maker of V-Belts

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Gates Super VULCO ROPE Drives

40% more Horsepower Capacity

TPA 814

Circle 688 on Page 51

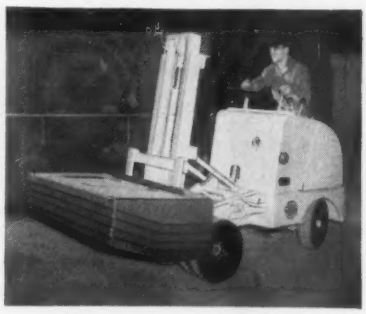
NEW! Multiple-tool R-18 Moto-Bug®

capacity: 3000 lbs.

Here is a new concept in material-handling methods that obsoletes expensive, single-purpose equipment. Kwik-Mix® Moto-Bug lets you haul, lift, stack, load, unload with *one* low-cost basic unit and easily-changed attachments. For example, check the new R-18 Moto-Bug, introduced here. As an 18-cu. ft. power wheelbarrow, or 42x54-in. flatbed truck, it hauls 3000 lbs., climbs 25% ramps fully loaded. As a tractor, it has 780 lbs. drawbar pull for towing wagons, carts — and 5-foot scraper blade for light clean-up, snow removal, etc. As a 7-foot fork lift, it handles 1500 lbs. at 15-in. load center.

This big-capacity, 4-wheel R-18 is maneuverable, light — travels at speeds up to 12 m.p.h. forward and reverse. There's direct drive to automatic power-flow transmission — *no clutching, no shifting.* It's powered by a 9.2 h.p. air-cooled gas engine — exhaust fume-control unit, or L.P. gas equipment optional. See Kwik-Mix distributor for a demonstration, or write us *today.*

Change R-18 Moto-Bug from hopper body to platform, and you have a heavy-duty 1½-ton truck. Towing hitch or 5-foot blade converts it to a light all-purpose tractor.



7-foot fork lift is easily attached to the R-18 Moto-Bug. Forks are adjustable 6 to 32 in. wide. Power tilts the mast 2° forward, 10° back for load pick-up, release.

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Send us literature on R-18 Moto-Bug with: ☐ hopper ☐ platform ☐ fork lift

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☐ *Also interested in smaller S-10 Moto-Bug with multiple attachments.*

because they permit an individual check on intake.

How to get the message to the men? A sign over drinking fountains can tell the story simply and serve as a constant reminder. The company publication or bulletin board can explain in greater detail, and if foremen and shop stewards have been provided ahead of time with a few standard answers about the value of drinking more water, the program usually gets under way without difficulty.

Other Fatigue Factors — Other physical factors besides thirst obviously contribute to fatigue, Dr. Brouha points out. These include age of worker, state of nutrition, amount of sleep, noise, dust, rest periods, and suitability of certain physical types for certain kinds of jobs.

All of these factors are complex in evaluation, however, and they vary greatly in different plants and individuals. The need of a perspiring foundry worker for water, is on the other hand, both a universal fact and a problem easily remedied. The extent to which "sweat loss" is replaced may have an actual dollars-and-cents effect on how much workers produce and how well they feel at the end of the shift.

Book Review

MOTION AND TIME STUDY, 4th edition, by Ralph M. Barnes, 665 pages, 6 x 9 in., published by John Wiley & Sons Inc., New York. Price $9.25.

This excellent text originally was developed to present the basic principles that underlie the successful application of motion and time study. Since the first edition, expansion of business and industry has provided increased acceptance, and many practices which previously were employed by a relatively few companies have become commonplace.

In this revision, five new chapters have been added which deal with motion study, mechanization and automation; mechanized time study and electronic data processing; systems of motion-time data; work sampling; evaluating and controlling factors other than labor; and multi-factor wage incentive plans. Further revisions include new material on developments in the industrial use of pulse rate as an index of physical activity. New information is included on statistical procedures in time study and on auditing methods, time standards, and wage incentive plans.

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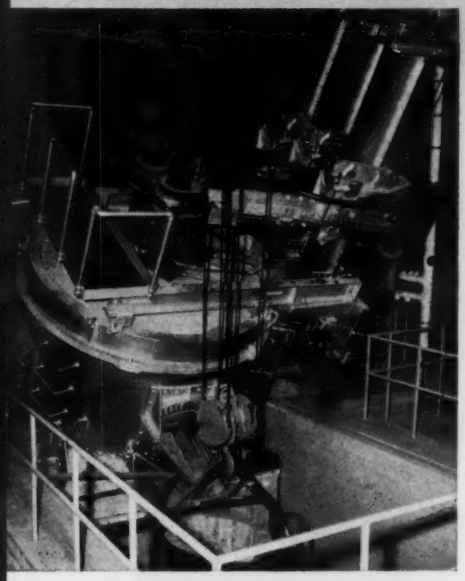
FOUNDRY ELECTRIC MELTING FURNACES ENGINEERED AND BUILT TO HIGHEST STEEL MILL STANDARDS



Swindell Electric Melting Furnaces for foundry service provide the productivity, low maintenance and long useful life built-in by genuine steel mill design and construction by steel mill melting furnace specialists. Write for a consultation.

WRITE for your copy of the latest Swindell Electric Melting Furnace Catalog — sent promptly on request.

Typical Quality Features

- **RUGGED, OVERSIZED ROOF CYLINDER** in permanent engagement with roof superstructure insures proper sequence. No manual clamps or kingposts—no special foundation. Cylinder is powered to level pyramided charged scrap in seconds.
- **SIMPLE, LOW COST FOUNDATIONS.** No cable tunnels or elaborate cable reeving—electrode hoist and roof cylinders are integral with furnace for proven maximum "on the line" performance.
- **INSTANTANEOUS ELECTRICAL RESPONSE.** Split-second control of melting is provided by Swindell service-certified electrical system.
- **REMOTE CONTROLLED ELECTRODE HOLDERS.** All vital parts out of heat and danger zone—yet accessible for quick visual inspection or maintenance.
- **4-POINT ROOF SUSPENSION.** Eliminates warpage; roof floats. Roof-change in minutes. An original SWINDELL development.
- **OVERSIZED I-BEAM ROOF RINGS** of Swindell design. Generous inside diameter to prevent damage to ring and refractory skewback. Built from true structural I-beam—no welds inside to fail from thermal shock. All welds outside to prevent cooling water reaching hearth area in event of damage.
- **BALANCED MELT-DOWN ECONOMY.** Optimum melt-down speed is integrated with correct KVA rating and furnace diameter for each furnace size, providing maximum performance without penalty in refractory and maintenance costs.

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Designers and Builders of Modern Industrial Furnaces
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"3/4 pint of Cities Service Core Oil to 240 pounds of sand"

Short baking time, excellent shakeout

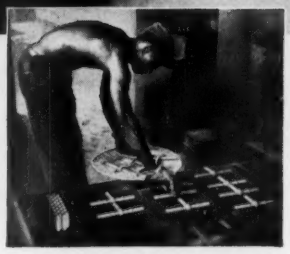
Model Brass Company of Decatur, Illinois produces 50,000 pounds of brass castings a month, mainly pump parts demanding the greatest precision in the making of cores.

That in itself would require an excellent core oil. But in addition, "90% of the castings made today are shipped tomorrow," according to General Manager Charles T. St. Clair.

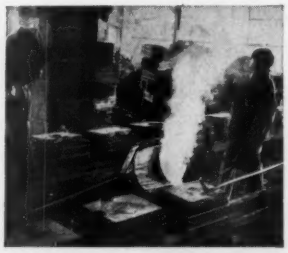
"That means we've got to have an oil with the fastest possible baking time and clean, quick shakeout properties.

"For these purposes, we've never seen the match of Cities Service Delco #62 Core Oil. And most unusual of all is the fact that such a small quantity of the oil goes such a long way. We actually use only ¾ of a pint of Cities Service Delco Core Oil for every four pans or 240 pounds of sand!"

When the jobs are tough and the time is short—that's the time for Cities Service Core Oils. Find out what they'll do for you. Talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, 20 North Wacker Drive, Chicago 6, Illinois.



Cores are placed in position before the pour. Model Brass is able to quick-bake its cores, maintain precision, and speed production with Cities Service Core Oil.

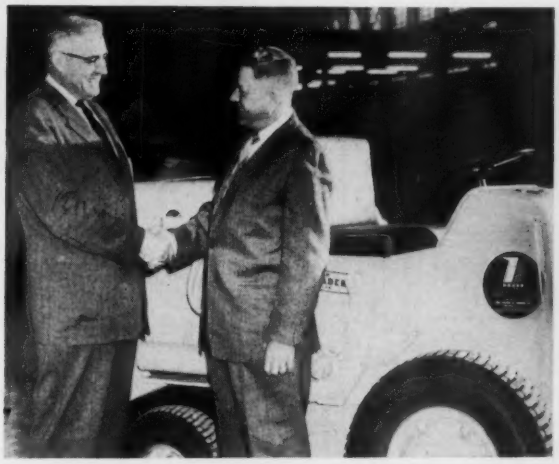


Made with 85-5-5-5 Brass, 90% of Model's castings are pressure tested. They've got to be good, and so has the Cities Service Delco Oil used in the cores.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

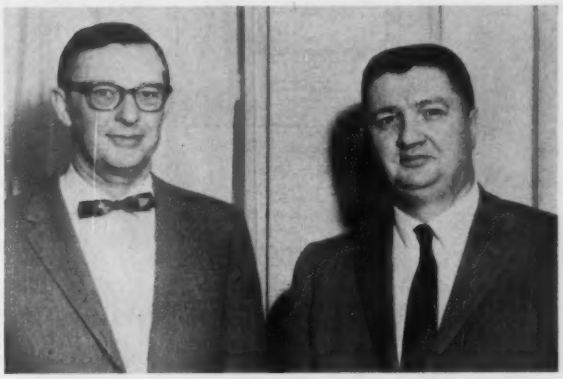
News Views



10,000 SHOVELS: C. T. Mitchell, left, accepts the 10,000th model HA Payloader from G. A. Gilbertson, president, the Frank G. Hough Co., Libertyville, Ill. Mr. Mitchell is president of Howell Tractor & Equipment Co., Hough distributor in Chicago, Gary, and Rockford

VISITORS: John B. Shallenberger, left, Shallway International Corp., and Gerald Nash, right, Quality Foundry Co., Los Angeles, demonstrate at that plant a shell core blower for Yugoslavian foundrymen B. Mrakovic and M. Tomivic

HOIST MANUFACTURERS: Arland R. Walkley, general manager, Manning, Maxwell & Moore Inc., Muskegon, Mich., was re-elected president, and Milton L. Aitken, general sales manager, Robbins & Myers Inc., Springfield, Ohio, was named vice president of the Hoist Manufacturers Association at its annual meeting



APPRENTICE WINNERS: Oregon Chapter, AFS, picked the winners shown below in its local apprenticeship contest. Left to right: Charles L. Wanless, Northwest Foundry & Furnace Co.; James Rogers, Oregon Steel Foundry Co.; Carl Williams, Pacific Chain & Mfg. Co.; Norbert H. Aicher, Willamette Pattern Works; Richard D. Rudig, Dependable Pattern Works. Winning entries were entered in the national AFS contest to be held at Cleveland. (Photo by Bill Walkins, Esco Ladle)

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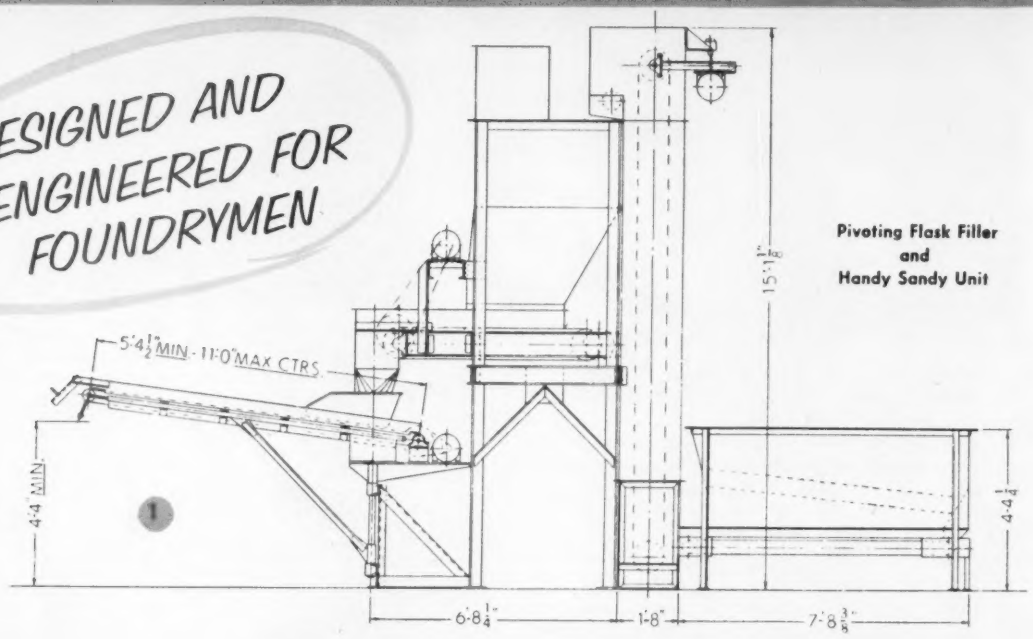
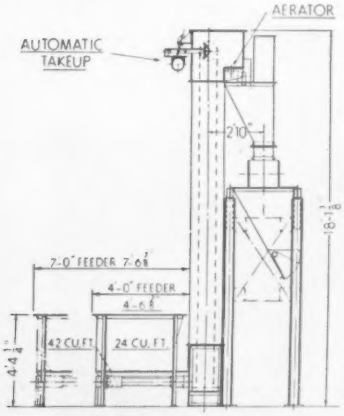
DESIGNED AND ENGINEERED FOR FOUNDRYMEN



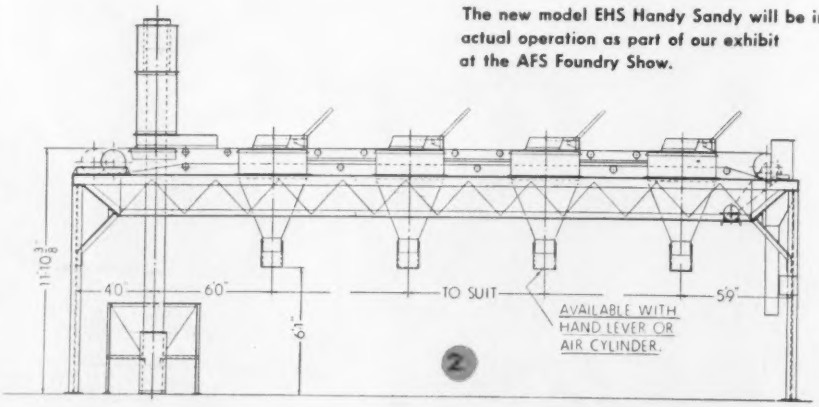
Pivoting Flask Filler and Handy Sandy Unit

1 This typical foundry set-up incorporates the new model EHS Handy Sandy or the Super Handy Sandy in conjunction with prepared sand storage and Pivoted Flask Filler. Capacity of sand to storage is up to 50 tons per hour. The Pivoted Flask Filler has a capacity up to 50 cu. ft. per minute as needed.

2 Showing the Newaygo model EHS Handy Sandy in an overhead sand distributor system. This new intermediate sand handling unit has a capacity of 25 tons of sand per hour and maintains all the features of the regular Handy Sandy such as: lower feed hopper, belt feeder, automatic elevator take-ups, automatic controls to eliminate overfilling, 8" x 5" cast buckets for elevating sand mounted on an endless rubber belt. The increased capacity of the EHS allows it to be used for feeding distribution systems having up to 18-20 hoppers.

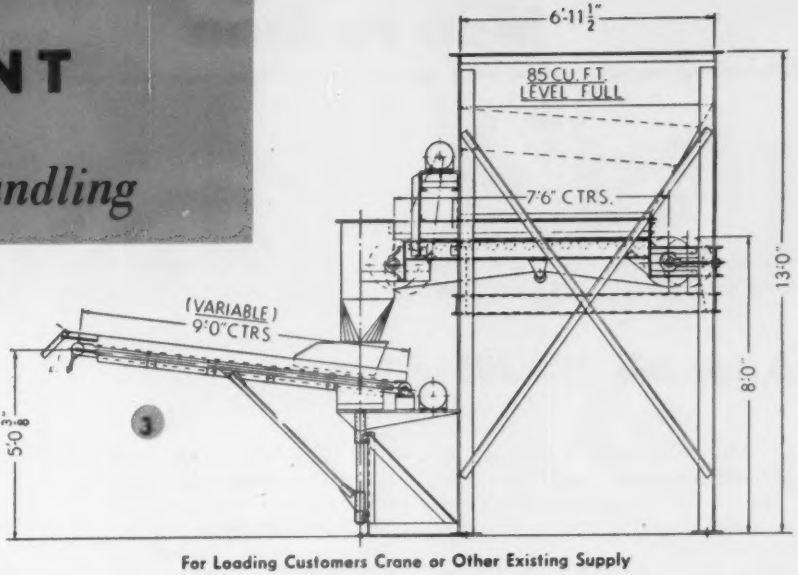


The new model EHS Handy Sandy will be in actual operation as part of our exhibit at the AFS Foundry Show.



EQUIPMENT

Foundry Sand Handling



For Loading Customers Crane or Other Existing Supply

3 This is the same basic unit as in illustration No. 1 except that the prepared sand storage hopper is filled by an overhead crane or other existing sand conveying or elevating equipment.

To demonstrate further flexibility of this equipment, the Newaygo Pivoted Flask Filler will be shown in operation at the AFS Show using a double arm pivoted filler arrangement which is recommended for extremely large flask work.

Special arrangements of these Newaygo units can be provided to suit all set-ups.

SEE

OUR OPERATING EXHIBIT AT THE AFS SHOW

All of our customers and other friends are cordially invited to visit the Newaygo exhibit at the Foundry Show. You will be able to see in operation the new EHS Handy Sandy, the Double Arm Pivoted Flask Filler and other Newaygo Sand Handling equipment.

NEWAYGO REPRESENTATIVES

from most of our territories will be in attendance during the show to discuss this and other foundry equipment with you. They can show you how to "Make Profits through Progressive Mechanization."

MONARCH KWIKSTRIP FLASKS AND JACKETS WILL BE ON DISPLAY

This rugged, mechanical corner flask has all the features of positive fingertip control, extreme precision, smooth design, parts interchangeability and very low maintenance.

NEW

FOUNDRY FILM

A 33-minute Newaygo movie in sound will be shown during the week. The movie features progressive mechanization in 9 foundries and is available for free use at AFS chapter meetings or private plant showings.
Get full particulars at the Newaygo booth.

AFS SHOW

CLEVELAND MAY 19 - 23

NEWAYGO EXHIBIT

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. . and profitable too, with NEWAY® MOLD HANDLING, SAND HANDLING AND CONDITIONING EQUIPMENT

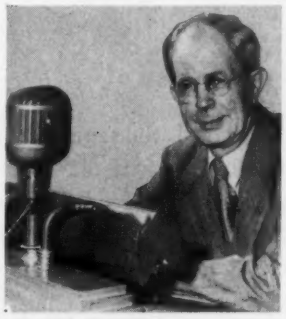
Circle 683 on Page 51

Man to Man

By RALPH L. LEE, *President*

Lee Hobby Foundry
Birmingham, Mich.

"It's one thing to take your work seriously, and it's another thing to take yourself seriously. You can't do both of them at the same time"



After All, It's All in Fun

SOME time back, I was up in Canada making speeches (the moral is, "Keep your big trap shut and they'll leave you home to do your work"). On that trip, I really got acquainted with a wonderful fellow I had known of for years; I sat next to him at the speaker's table. He had to make a speech, too, and when his turn came, he certainly did a swell job.

I don't know when I have heard such a well planned, right-to-the-point presentation expressed with exactly the right choice of words and spoken with such clarity that I am sure every one of the close to 200 persons facing him got everything he had to say.

But to me the big thing about his talk was that after the first paragraph or two, I for one—and being just about average, I imagine every one else in the place, too—was ready to swallow hook, line, and sinker everything else this fellow had to say.

The Viewer With Alarm—During the meal and before the talk, I was sandwiched between this speaker and another fellow to my right, with a regular ping-pong conversation switching back and forth in front of me. I felt like a net. The fellow on the right was doing most of the talking and was very serious. In fact, he took himself far more seriously than the views he expressed seemed to deserve. From what he said, he was pretty much set in his ways, held the standards he had chosen pretty highly, and viewed with alarm the current human relationships in business, politics, and society. He left no doubt that these relationships were far below his standards.

But finally, by waiting my chance, I managed to pry my distinguished speaker loose and into conversation. In answer to a direct question, he said, "You know, after a whole lifetime of closely packed work schedules and hundreds of hours of what some people call overtime, with tough-nut problems to solve, I believe one thing has kept me going: For years I have kept saying to myself, 'After all, it's all in fun.'"

My talkative friend on the other side of the net came back with a potent serve—"But what about the ideals—the cause—the need—the principle—the challenge—the situation—the mess the world is . . . ." Then the pounding gavel cut him short.

After luncheon, my host, one of the lieutenants of the speaker, told me that he, and everyone else around their place, was very much concerned over the tremendous work load the speaker was carrying, and he described the efforts they were making to get him to slow down. "He's so important to us all that we don't want anything to happen to him," he said.

Feeling a Boy Scout urge, I buttonholed the speaker, told him what I had heard about him working himself to death, and added a word of fatherly caution. He just laughed.

"There's absolutely nothing to it," he said. "The truth of the matter is that I'm having the time of my life. You see, Doc, I can say honestly that I do not worry. That's where my slogan, 'After all, it's all in fun,' comes in."

"Yessirree, I certainly can see," I agreed, "and furthermore, I know darned well you're close to something there that can do a lot of people one whale of a lot of good."

A choice of Attitudes—Encouraged by my enthusiasm, my friend went on, "Let's say you've got a real problem to solve, one that's seriously affecting the business and the welfare of a lot of people. Now you can go at that problem loaded down with the fear of failure, crippled with righteous indignation at the dumb bums who shouldn't have done what they did to get you into the mess, or at conditions, or at what-have-you.

"On the other hand," he went on with a twinkle in his eye, "if you stop for a moment and let the thought ooze through your mind that a hundred years from now this problem will be lost in history and that you already have solved a lot of darned sight more difficult problems than this one, then you can rub the old hands together as you would at a game of checkers and

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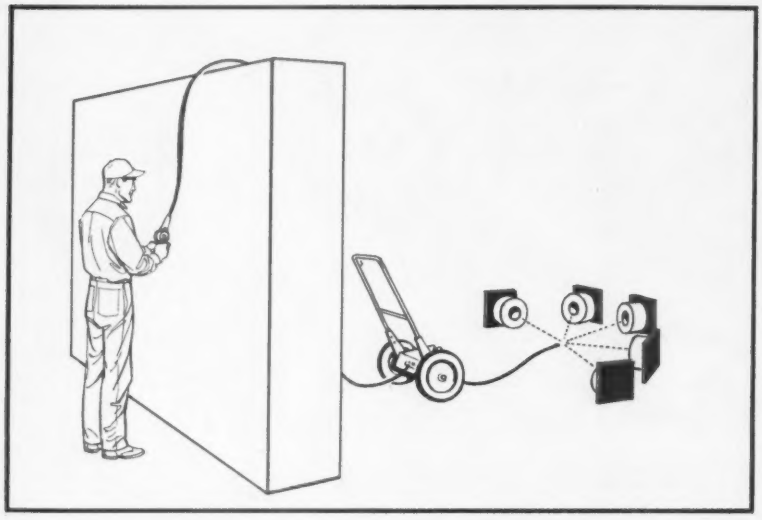
actually look forward to the fun of weighing this against that. You can scan the possibility of this and that and the other thing and root around in the bag of tricks you've used in the past. In all probability you'll find one of them that you can use now."

Since my visit, I can't help but think that in spite of what my friend had to say and in spite of his fine spirit, that he too probably has his moments. But I'll bet they are farther apart than those of some of my foundry friends whom I run into here and there. It's one thing to take your work seriously and another to take yourself seriously. You sure can't do both at the same time. One will detract from the other.

A friend of mine once painted a big mural, with a scrawny angel in it who was pointing to a book being read by a rednosed, bleary-eyed old codger. In beautiful gold letters the book said, "And thus spoke the angel, this is the greatest precept of them all: Don't take yourself too damned seriously."



Fort Pitt Steel Casting Saves Time and Money With Radiography Machine that Uses Cobalt *and* Iridium Sources

The quality control group of the Fort Pitt Steel Casting Division of Pittsburgh Steel Foundry Corporation, McKeesport, Pa., saves manpower, time and money by radiographing valve bodies with Nuclear Systems' Model 52 Multitron, a safe and versatile radiography machine.

Said one of the quality control engineers, "We use 20 curies of Iridium 192 for inspecting lighter sections of steel and alloy castings up to two inches. We also use Cobalt 60 in the same machine to radiograph valves up to 16 inches in diameter.

"Nuclear Systems' Model 52 enables us to do any sort of radiographic inspection here in the plant instead of the time-consuming method formerly used."

Call on Nuclear Systems for *all* your radiography equipment needs. Offices in Philadelphia, Chicago, San Francisco and Los Angeles. Sales representatives in major cities. Catalog on request.

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May 12-16. State Fair Park, Dallas, Texas

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West Coast Symposium Deals With Magnesium Applications

The Society of Aircraft Materials and Process Engineers and the Magnesium Association will conduct a West Coast symposium on magnesium applications in aircraft and missiles on June 4-5 at the Institute of Aeronautical Sciences Bldg., Los Angeles.

By combining discussion of technology with actual structural practice, an effective presentation and evaluation will be possible. Tentative plans call for the first day's papers to be confined to technology and process control. The two sessions of the second day will be devoted to papers prepared by individuals from the aircraft industry who are responsible for the incorporation of magnesium in aircraft and missiles.

Commitments for papers have been made by Convair, Hughes Aircraft, Lockheed, Martin, Northrop, and Douglas. A panel on magnesium applications in the missile program and discussions of specific aircraft applications and problems are promised. Key technical men from major magnesium fabricating plants and foundries, and representatives of Dow Chemical Co. and Magnesium Elektron Ltd., England, are preparing papers. Details of the program are available from the Magnesium Association, 122 E. 42nd St., New York 17, N. Y., or from the Society of Aircraft Materials and Process Engineers, Los Angeles.

Publication of Lynchburg Foundry Receives Award

For its company employee publication, *The Iron Worker,* Lynchburg Foundry Co., Lynchburg, Va., has received a George Washington Honor Medal Award, given by the Freedoms Foundation, Valley Forge, Pa., an organization created to bring about a better understanding of the basic principles underlying the republic. President Dwight D. Eisenhower is honorary chairman.

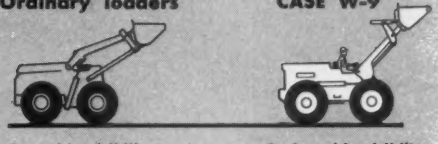
Object of the annual awards program is to honor outstanding efforts to improve public understanding and appreciation of the rights and freedoms inherent in the American way of life. Lynchburg Foundry received the national award in the company employee publication category.

M. C. Elcan Jr., editor of *The Iron Worker,* will receive an identical award.

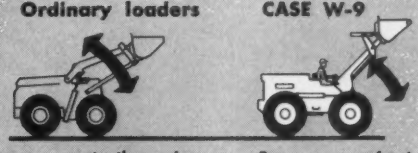
Circle 685 on Page 51

Let us show you how the CASE® W-9 can cut your costs

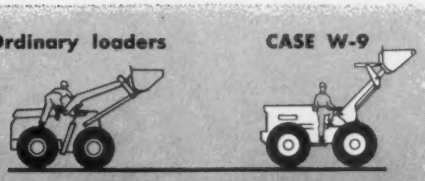
Compare VISIBILITY



Compare OPERATOR SAFETY



Compare CONVENIENCE



No matter what make of *4-wheel-drive* loaders you may own now — or are thinking of buying — it will pay you to *compare them side by side* with the new Case W-9 Terraload'r.

Field tests already have shown that this new Case-built, Case-powered loader can *dig more, carry more, dump faster — and with greater safety to the operator* — than competitive loaders costing as much as $1000 more. Best of all, the Case W-9 gives you a choice of 3 quick-change buckets — *1¼ cu. yd.* for heavy-duty digging, *1¾ cu. yd.* for standard materials; and *2¾ cu. yd.* for light materials — heaped capacities.

Remember, the *only* way to compare is to *see the W-9 in action* at your Case Industrial Dealer's — or mail coupon below for a free demonstration *on your own job*.

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Circle 686 on Page 51

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LITHIUM COPPER CARTRIDGES

Lithium isn't new to foundrymen. But the new, improved, 4.50 gram cartridge is. Thinner walls react with the melt faster. Nearly 100% greater compactness means savings in weight and storage space. New "Compression-Spin" seal assures longer shelf life. Over 99.9% copper assay offers the near-ultimate in purity.

Three other handy sizes, 2.25 and 9.0 gram cartridges, plus a 108.0 gram charge in cup form, offer any combination of weights for introducing any percentage of lithium in the melt.

The 4.50 gram cartridge represents 0.010 lbs. of lithium rod. It will refine 200 lbs. of copper or copper-base alloy. All oxygen is removed, fluidity increased, pouring temperature often lowered, oxide and slag inclusions reduced, grain refined, and gas cavities eliminated—*with no change in conventional melting and casting processes.*

The end result is a superior casting: sounder, denser, more uniform, more electrically conductive—at less trouble and less cost. Write for details.

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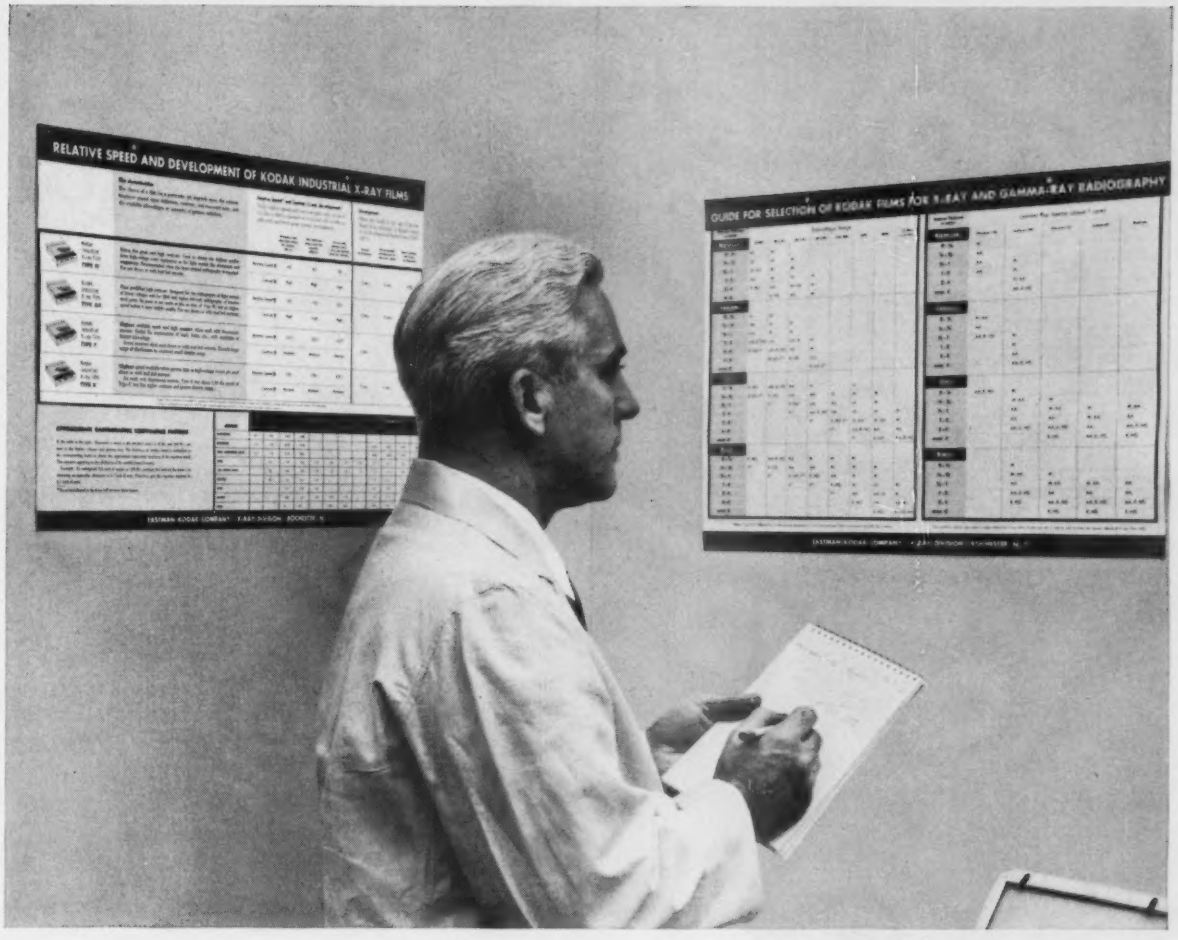
Obituary

COL. CAL C. CHAMBERS, 69, president - general manager, Texas Foundries Inc., Lufkin, Tex., died March 16. He was educated at Culver Military Academy and University of Wisconsin. During World War I in serving overseas as a lieutenant colonel he won decorations from France, Belgium, and the United States. In 1922 he was made a colonel, War Department General Staff, U. S. Army, and from 1922-1931 served as executive officer, Culver Military Academy. Colonel Chambers was vice president-treasurer, Wrought Iron Range Co., St. Louis, from 1931-1938, and vice president-general manager, Southern Malleable Iron Co., East St. Louis, Ill., from 1935-1938. He became executive vice president, Texas Foundries in 1938 when the company was organized and had been president-general manager since 1939. Colonel Chambers served as president of the Malleable Founders' Society in 1951-52.

COL. CAL C. CHAMBERS

Herbert B. Luria, 55, president, Luria Steel & Trading Corp., and Luria Engineering Co., New York, died March 11. A graduate of Yale University, Mr. Luria founded the Luria Engineering Co., with plants in Bethlehem, Pa., and Chicago.

John J. Boland Sr., 71, associated for 40 years with Griffin Wheel Co., Chicago, died there March 14. He entered the company's brake shoe foundry and later worked in the molding and melting departments of the wheel foundry. He had charge of the plant office until World War I when he returned to the operat-


RELATIVE SPEED AND DEVELOPMENT OF KODAK INDUSTRIAL X-RAY FILMS
GUIDE FOR SELECTION OF KODAK FILMS FOR X-RAY AND GAMMA-RAY RADIOGRAPHY

Important Radiographic data at a glance

Free Wall Charts give you latest information on film selection, relative speed, and contrast.

TODAY's fast films and varied radiation sources give the present-day radiographer many new opportunities for establishing exposure factors to meet unusual conditions and get better radiographs.

So that you can have the latest information right before you, Kodak has prepared two quick-reference wall charts—one, a guide for selecting the best type film for your x-ray and gamma ray work—the other, showing relative speed, contrast, and development of Kodak Industrial X-ray Films.

These charts are yours—free for the asking. Just drop us a line and you'll get yours by return mail.

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Circle 679 on Page 51

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Completely New Foseco® DEGASER 400

- Inexpensive
- Easy to use
- Very little fuming
- Completely eliminates gas
- Produces high quality castings ... economically

DEGASER 400 being plunged into aluminum alloy melt. Test results confirm that DEGASER 400 can produce aluminum alloy melts of such low hydrogen content that even in the heaviest cast sections pinhole porosity due to absorbed gases is eliminated.

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ing department. In 1920 he was transferred to the Detroit plant where he was made superintendent. While there he served as president of the Detroit Foundrymen's Association. Mr. Boland returned to Chicago and was operating superintendent there, and retired in 1947.

Sheldon K. Towson, president, Elwell-Parker Electric Co., Cleveland, died Mar. 27. With the company since 1927, he had been president-general manager since 1942. Sheldon K. Towson had been a former president of the Material Handling Institute.

Lester E. Wilensky, 37, since 1953 developmental engineer in the magnesium technical service and development group, Dow Chemical Co., Midland, Mich., died Apr. 6, in a plane crash at the Midland airport. He joined the company in 1949.

Robert H. Hoffman, 43, president, Robert W. Hoffman Co., Chicago, welding equipment and abrasive sales firm, died March 11, at his home in Cary, Ill.

Frank J. Neudorf, for the last 28 years secretary-treasurer, Sheffield Foundry Co., Chicago, died March 14. He had been with the company for 39 years.

Alfred E. Porter, 56, from 1945-55 vice president-general manager, Alloy Steel & Iron Casting Div., Howard Foundry Co., Chicago, died March 15, in Phoenix, Ariz.

Alexander S. Wright, for the last eight years, New England sales representative, Springfield Facing Inc., Willimansett, Mass., died March 2.

John J. Dix, 84, founder and owner, Superior Aluminum Foundry, Chicago, died March 31 in St. Francis Hospital, Evanston, Ill.

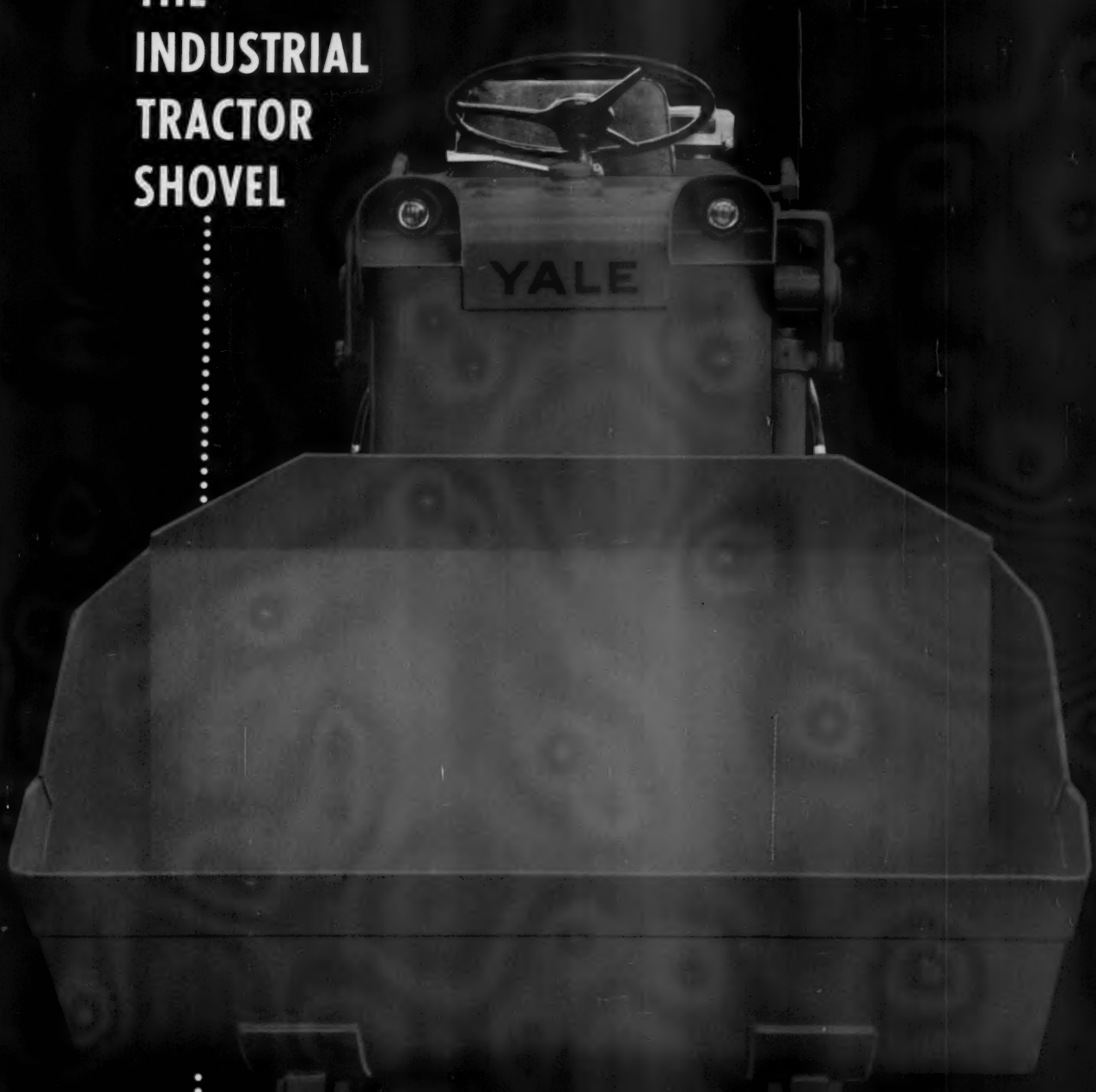
Daniel W. Leedy, 53, foundry manager, Dalton Foundries Inc., Warsaw, Ind., died Feb. 14.

To Market Refractory Gun

Refractory gun of the Blastcrete Equipment Co., Los Angeles, will be distributed in foreign markets by Shallway International Corp., Palo Alto, Calif., and Crawley, England, under an arrangement completed between the two companies.

YALE leader in materials handling introduces

THE INDUSTRIAL TRACTOR SHOVEL



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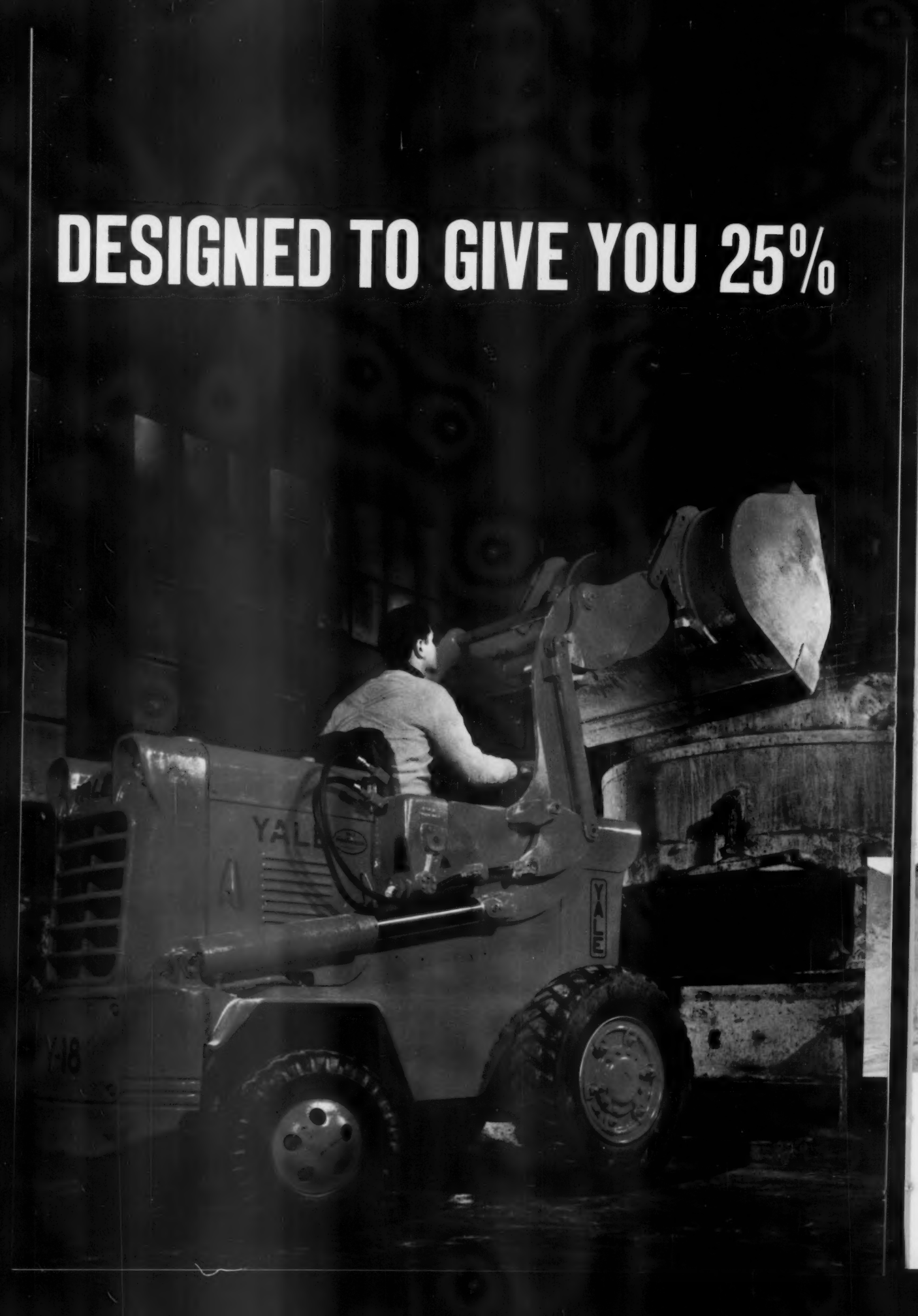


MORE WORK EVERY HOUR

through these exclusive Yale features...

- **Yale Torque Transmission (fully automatic)**
- **Safety-curve arms**
- **45° ground-level bucket tipback**
- **Accelerates to operating speed of 8 mph. in 3.5 seconds—to a speed of 13 mph. in 5.5 seconds**
- **6 foot dumping clearance**
- **Front and rear operating lights**
- **Sealed brakes**

At last—a tractor shovel designed especially for industry!

Whether you handle bulk chemicals, sand, gravel, scrap or raw materials, you'll get more productive work at less cost per work unit with this new concept in a tractor shovel. Yale designed it that way.

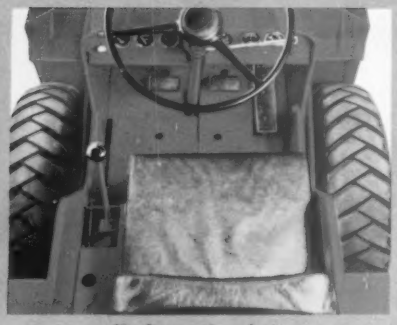
Yale designed it for tight areas—built it *compact* (only 117" overall length) so that it can maneuver in any aisle wide enough for a wheelbarrow. *Accelerates* to an *operating speed* of 8 mph. in 3.5 seconds and to a top speed of 13 mph. in 5.5 seconds. Yale's exclusive *Torque Transmission—fully automatic* (proved the world over on Yale Industrial Lift Trucks) permits quicker, smoother starting, eliminates shifting, provides more power under load-conditions—in a word, *speeds cycle operations.* This extra speed, combined with the greatest carrying capacity of its class (full 2500 lbs.) *means up to 25% more work per hour.*

Yale's loader-linkage design offers unique advantages. Exclusive 45° *Ground-Level Tipback* gives the ultimate in loading action—and a grade-level carry-position that minimizes spillage. Exclusive 6 foot *Dumping Clearance* is the highest on any model of comparable wheelbase. And here's a feature your operator will like! Bucket is *Automatically Self-Locating;* he merely lowers from full dump position to ground-level – bucket automatically returns to dig position.

a product of Yale's integrated design—these engineering advances are standard features

- **Gasoline; LP-Gas powered**
- **Sealed hydraulic system—keeps dirt out**
- **Pre-cleaner—air cleaner combination**
- **Extra strong heavy welded steel frame—greater safety, longer life**
- **Automatic bucket return to dig position**
- **Carrying capacity of 2500 lbs.—bigger load capacity**
- **Short wheel base—minimum turning radius**
- **Sealed generator and distributor**
- **Balanced weight distribution**
- **Maximum speeds up to 13 mph.**

LET YOUR OPERATOR DRIVE IT!



Uncluttered cockpit

Safety-curve arms

Maximum visibility

See the Yale Industrial Tractor Shovel in Action

New Yale Industrial Tractor Shovel is available for demonstration through your Yale Representative. Whether you visit his showroom or arrange a demonstration at your plant, be sure you see it in action. And be sure your operator drives it.

He'll like the roomy, uncluttered, comfortable cockpit. Adjustable seat gives him plenty of leg and foot room. Finger-tip controls are conveniently located just below steering wheel and to the left of his seat. Yale Torque Transmission with one speed forward and reverse—one directional control lever. And he'll especially like Yale's exclusive *Safety-Curve Arms*. Gives him plenty of safe elbow room—and extra visibility when bucket is raised.

For a demonstration, or for further information, write to The Yale & Towne Manufacturing Co., Dept. Y-18, Philadelphia 15, Pa.

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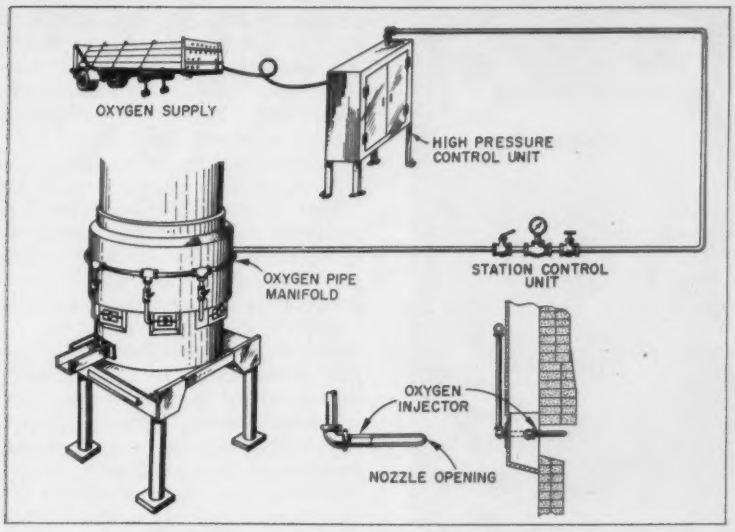


Fig. 1—Schematic drawing of typical cupola oxygen injection installation. Drawings at lower right show oxygen injector

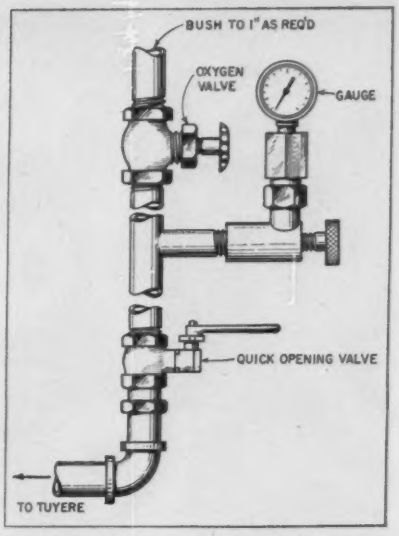


Fig. 2—Station control equipment for cupola tuyere injection

Oxygen Injection Process Aids Cupola Combustion Control

By JOHN B. LA POTA
Research and Development Dept.
National Cylinder Gas Co.
Chicago

OXYGEN as a production tool in the cupola melting of iron now is widely accepted in the foundry industry. Fed into cupola air systems, it has speeded melting operations, resulted in more efficient use of fuel, permitted higher tapping temperatures, and increased production rates.

A new method of using oxygen in the cupola, developed recently by National Cylinder Gas Co., offers the additional advantages of better combustion control and greater oxygen economy. This method is known as the Controlled Cupola Chemistry Process.

The conventional method of using oxygen in the cupola, known as the blast enrichment system, is applied widely and involves introducing oxygen into the air duct at or near the blower. This system simply creates an atmosphere richer in oxygen so that it can support combustion more easily than air alone. Good as it is, the blast enrichment system has two major limitations: 1. Oxygen is diluted with air to the extent that it loses much of its effect before entering the cupola. 2. Considerable oxygen is wasted due to leaky tuyeres and other fittings.

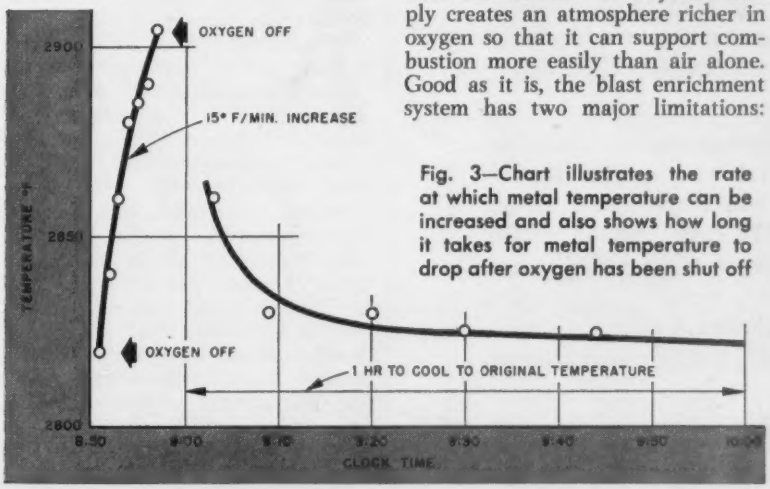


Fig. 3—Chart illustrates the rate at which metal temperature can be increased and also shows how long it takes for metal temperature to drop after oxygen has been shut off

In the new process, streams of pure oxygen are injected directly into each tuyere at a velocity somewhat greater than that of the air blast. In this manner a localized concentration of pure oxygen is created in the combustion area. This result has numerous advantages over conventional blast enrichment. The process is applicable to large and small cupolas, including water-cooled types and those operating on either long or short melting cycles. Further, the technique can be used for either basic or acid cupola processes.

Accompanying illustrations describe the method rather fully. Fig. 1 and 2 show the location of the nozzle opening for oxygen injection in each tuyere and indicate the piping and control specifications to insure adequate pressures and capacities at all tuyeres.

Inventors of the process and engineers who have been involved with installations to date classify the advantages as follows:

Higher Initial Temperatures — Oxygen can be used for a short

Pouring molten cadmium copper at Triangle Conduit and Cable Co., Inc.

Triangle Conduit and Cable Co.

CUTS FURNACE MAINTENANCE COSTS

with Shamva Mullite SM-711 refractory

Two years ago, the Triangle Conduit and Cable Company, of New Brunswick, New Jersey, was dissatisfied with the linings of their low frequency induction furnaces, which were melting copper base alloys. Anxious to improve their yield, Triangle ordered a trial installation of Shamva Mullite SM-711 refractory.

The results, recently evaluated, showed a remarkable increase in the life of the Mullite lining compared with the competitive material previously used. This despite punishing attacks from 31 alloy changes during its long life.

Triangle's furnace maintenance costs, including down-time, cleaning, and labor, were greatly reduced, while productivity was increased. Chances are, Shamva Mullite SM-711 could create similar savings for *you*, too. And it costs nothing to find out. Write to *Mullite Works, Refractories Division, H. K. Porter Company, Inc., Shelton, Conn. In Canada, H. K. Porter Company (Canada) Ltd., Toronto, Ontario.*

H. K. PORTER COMPANY, INC.
REFRACTORIES DIVISION

period of time at the start of operation to ignite the bed completely and uniformly. If oxygen is used for a period of five to ten minutes immediately after the wind is turned on, the initial tapping temperature is higher, and castable metal is obtained as quickly as possible.

Less Metal Pigged—Because the materials charged in the cupola respond more quickly to reaction with pure oxygen, a more rapid metal temperature pickup can be obtained. Inasmuch as castable metal is produced almost instantaneously, pigging of the metal can be eliminated, thus resulting in high metal yields.

Re-establishing Operating Conditions—Should there be any reason for the cupola operation to be interrupted, such as a shutdown for lunch or an unexpected breakdown, oxygen can be used to re-establish quickly the temperature lost during the period of delay.

Coke Combustion—When the percentage of oxygen available for combustion is increased, any fuel naturally will burn more completely, thereby improving combustion efficiency. It therefore may be possible to use a cheaper grade of coke with oxygen.

Alleviates Bridging — Although bridging is not completely eliminated through the use of oxygen, it is relieved to the extent that the accumulation of solidified slag and cold coke forms a permeable network which can be heated more rapidly and, thus, removed quite readily. Also, the high-velocity single oxygen jet in each tuyere can be used to alleviate the "dark tuyere" condition caused by solidified slag and metal.

Combustion Control—In conventional air operation and in the oxygen blast enrichment process, it is necessary to make time-consuming adjustments in combustion conditions, such as changing blower output, adjusting charge make-up, and waiting for the adjusted charge to descend to the hearth area. By the injection of oxygen through the tuyeres, however, these abnormal conditions in cupola melting can be corrected immediately.

Metal Properties—More uniform metal temperatures often result in improvements in the physical properties of the casting and better control of the composition of the metal. A more consistent cupola operation should result in better silicon and manganese recovery. Comparative average analyses based on four tests taken during the operating cycles of iron produced in one shop with and without the use of

oxygen show the results given in Table I. Although the tests were conducted about a week apart, the charge materials placed in the cupola are presumed to be about the same for the two periods.

The higher silicon recovery and lower sulfur are due in part to the more uniformly higher metal temperatures which are produced through the use of oxygen. However, it should be noted that the higher recoveries and lower sulfur also may be due in part to differences in quantities of the various elements in the charge materials.

Minimum Oxygen Consumption—Because of the method of direct injection, the amount of oxygen necessary to obtain optimum conditions is smaller than with the blast enrichment method. In addition, the air blast flow can be reduced by a ratio of approximately five volumes of air for every one of oxygen injected. No oxygen is lost in the injection process through air-duct leakage, misfitting tuyere doors, etc.

TABLE I—Comparative Analyses

	Totals				
	Si	Mn	C	P	S
Conventional Air Practice	2.09	0.55	3.31	0.310	0.148
Oxygen Practice	2.23	0.69	3.31	0.214	0.101

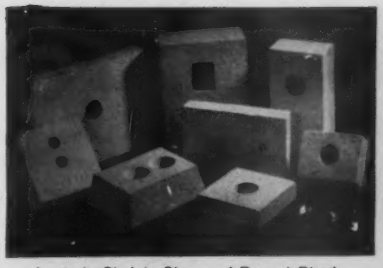
Metal Characteristics—Experience indicates that the metal does not appear to be affected if oxygen is used judiciously in the cupola. Indiscriminate use of oxygen may, however, result in oxidized metal.

Refractories—The high concentration of oxygen does not reduce refractory life because the oxygen is directed into the center of the cupola and then consumed by the many reactions taking place in the reaction zone.

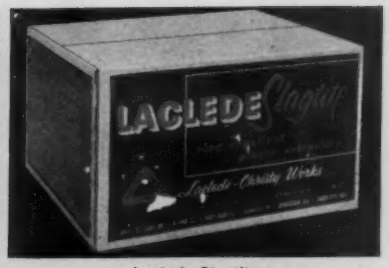
Whenever a closer control of the chemistry of the new process is desired, a fuel gas duct can be incorporated into each oxygen injector assembly. In this way, oxygen alone, fuel gas alone, or both, can be injected into the combustion zone whenever conditions demand it.

Oxygen is, of course, used when an oxidizing condition is desired, and fuel gas when a reducing condition is desired. Furthermore, if the temperature of the coke opposite the tuyeres drops below the normal ignition point and the slag begins to solidify, both fuel gas and oxygen may be used simultaneously as a high-temperature torch to reignite the coke and liquefy the slag, thus opening up the tuyere.

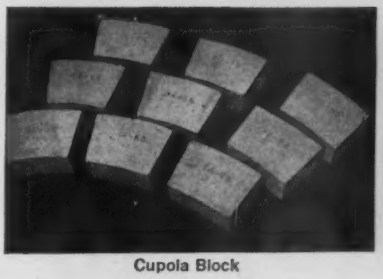
In effect, the rapidly moving stream of oxygen injected through



Laclede-Christy Slag and Breast Block



Laclede Slagtite



Cupola Block

Spout Runner Tile

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THE YELLOW PAGES, under "Refractories", will give you the name of your local field representative or distributor. Contact him for information, or write to *Laclede-Christy Works, Refractories Division, H. K. Porter Company, Inc., St. Louis 10, Mo. In Canada, H. K. Porter Company (Canada) Ltd., Guelph, Ontario.*

For free catalog No. 46, titled "Laclede-Christy in the Foundry", write on your letterhead to the address above.

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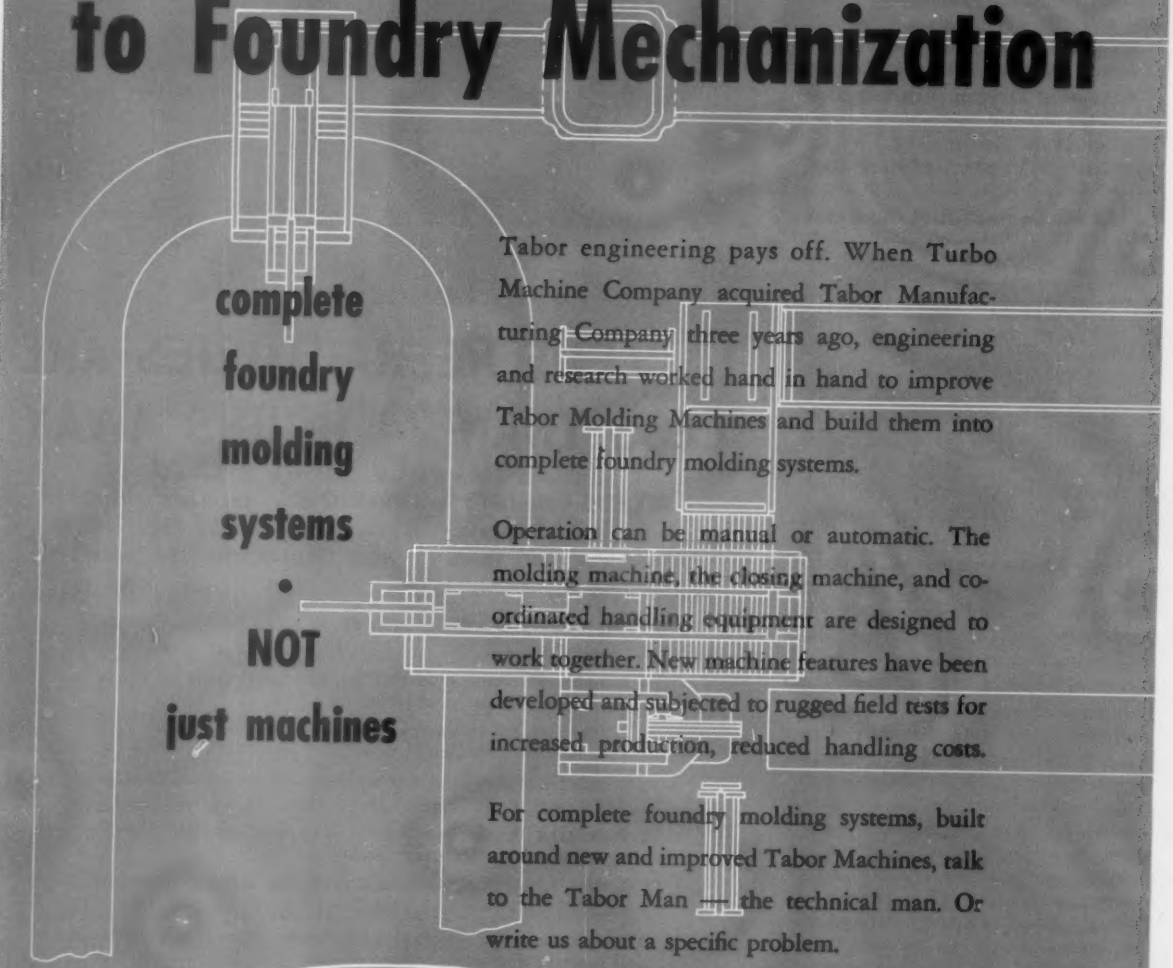
REFRACTORIES DIVISION

Circle 692 on Page 51

NEW APPROACH
to Foundry Mechanization



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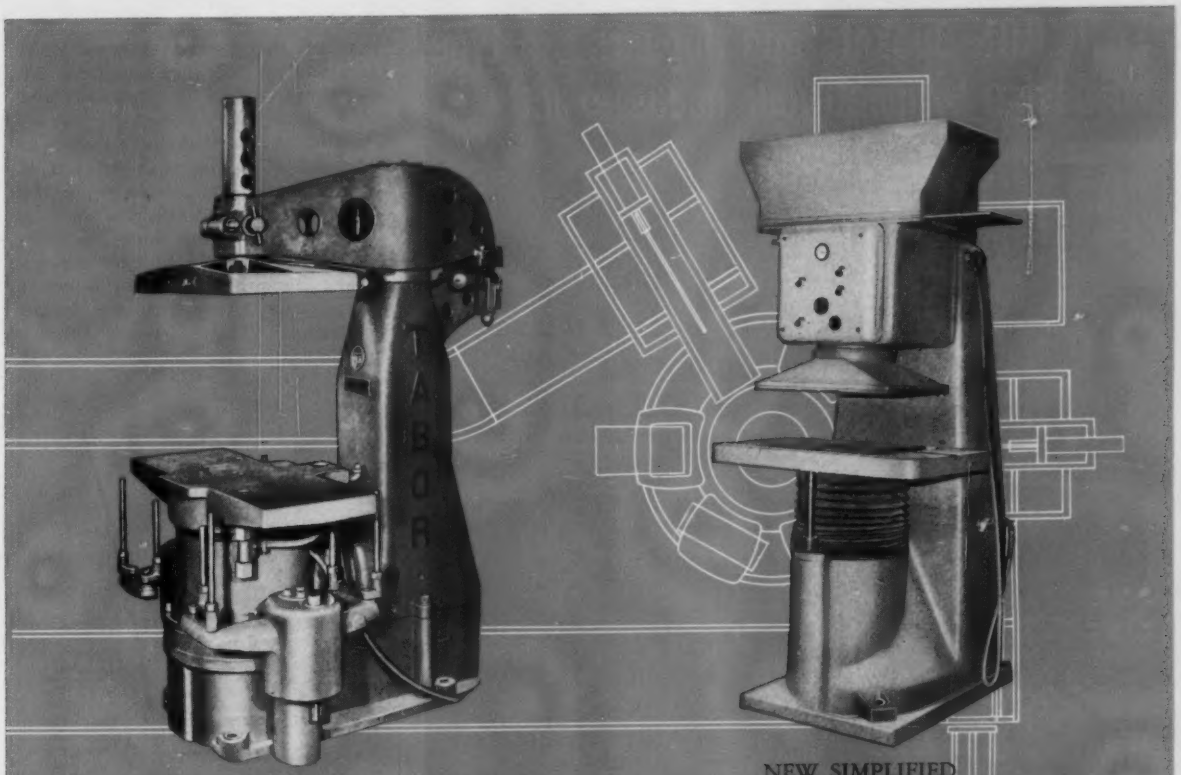
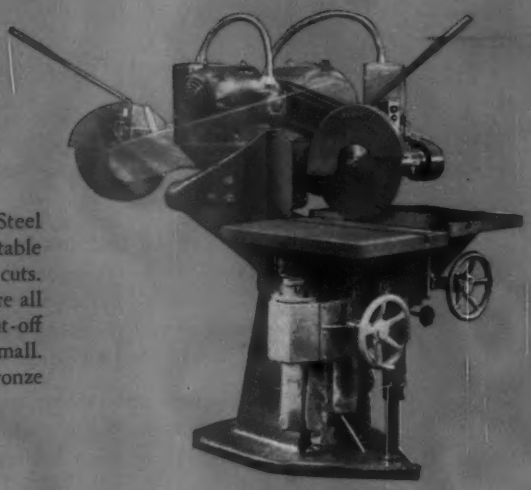


The new Tabor "350" simultaneous squeeze-jolt machine for molding copes and drags singly, or in combination. Down-draw type. Permits stepped-up conveyor line production, even when the flask is deep and the mold is difficult.

NEW SIMPLIFIED
TABOR SAND EXTRUDER

Acts instantaneously to fill cavity with sand. Main valve design prevents propelling air from entering cavity and also functions for low-pressure prefill and quick exhaust — assures uniform density of resulting core or mold. Prevents abrasion of cavity walls.



New Tabor 15 H.P. Cut-Off for Steel Foundries. Features new hydraulic table lift, gives less operator fatigue, faster cuts. Steel, nodular iron, titanium — they're all the same to this Tabor-Brasive cut-off machine. Finish grinding costs are small. Also suitable for larger size brass, bronze or aluminum cut-offs.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

Circle 693 on Page 51

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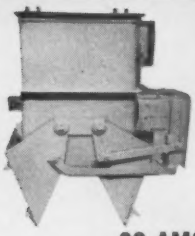
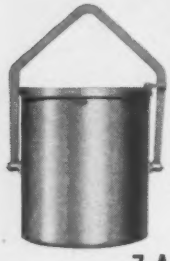


30-AMO

1-A



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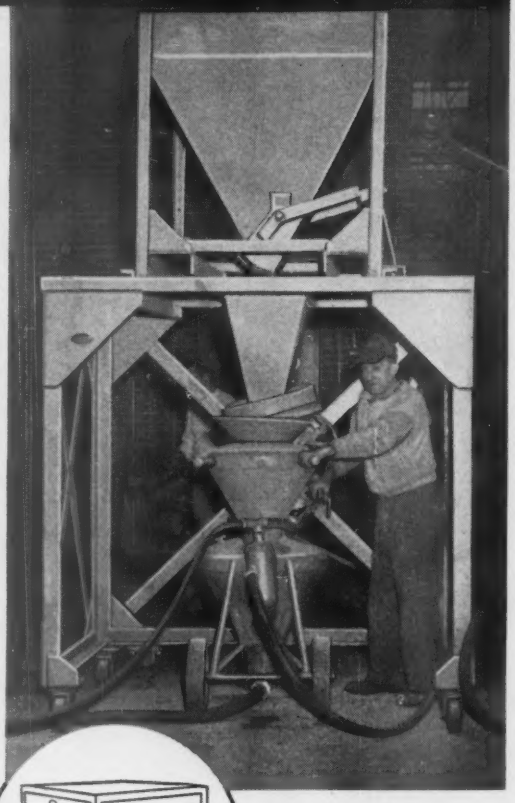
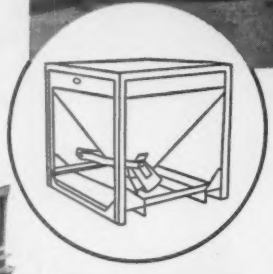
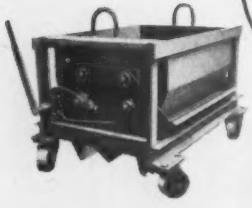




A special P-I designed hopper bucket makes cupola lining more efficient.



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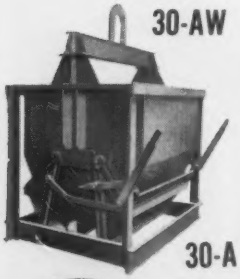

30-A

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SEE what Penn Iron special equipment can do to up your production. Write today, describing your problem, or ask to see a P-I representative.

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PENN IRON WORKS, INC.

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the tuyere virtually isolates a section of the tuyere cross-sectional area and protects that area from the damaging effects of unconditioned blast air.

Efficient operation of a cupola is predicated on the maintenance of a satisfactory balance between the air input rate and the flow of coke into the hot reaction zone. The coke-air reaction should liberate enough heat to melt and bring to the proper temperature a predetermined weight of metal. This chemical balance is difficult to maintain in the cupola

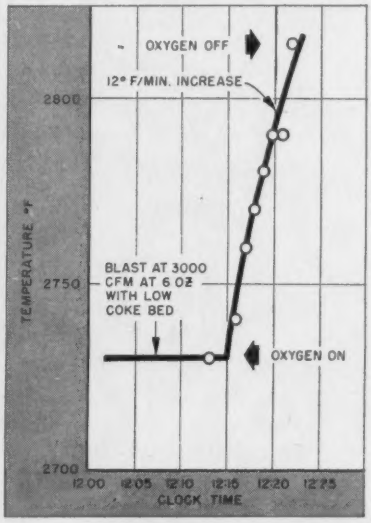
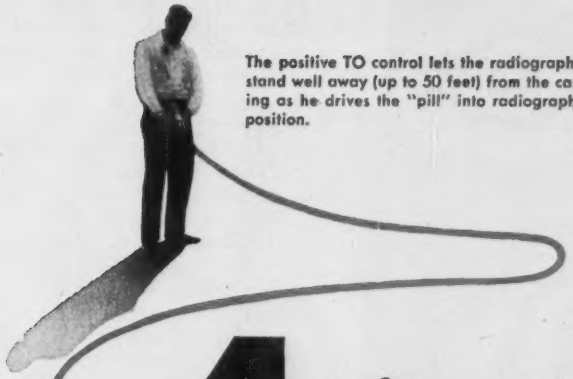


Fig. 4—Chart shows how soon temperature can be recovered after an artificially unfavorable operating condition has been created

unless frequent adjustments can be made in the air flow rate or coke burden to re-establish efficient combustion. Let us examine how the new oxygen process simplifies this manipulation.

Coke Combustion Speeded—The value of the addition of pure oxygen at the tuyere lies principally in the ability of the oxygen to burn more coke per unit of time and to minimize the cooling effects of nitrogen and moisture. This results in a higher thermal output at higher efficiencies. The additional available heat increases the melting rate, delivers the metal with greater superheat, and produces higher fluidity. By judicious variation of the volume of injected oxygen, while a predetermined air blast volume is maintained, a very efficient combustion and metal producing balance can be attained.

In one shop it was frequently difficult to obtain metal temperatures above 2680° F before the second or



The positive TO control lets the radiographer stand well away (up to 50 feet) from the casting as he drives the "pill" into radiographic position.

4 minutes does it

The man up there radiographing that 2" thick steel casting down there will have the job done in four minutes.

That's how fast modern gamma radiography is.

The isotope he's using (Iridium 192) will give him 2% sensitivity, too. Matter of fact, you can easily get 2% sensitivity in sections up to 6" of steel, brass, copper, bronze . . . even *lead* . . . when you match the isotope to the job.

Makes no difference what you *make* or *buy* or *sell* (plastics, light metals, fabricated parts, assemblies—the list is endless) if it needs radiographic "seeing into" for quality control, we have the machine (gamma or x-ray) to do it most efficiently.

If *you are* confronted by an inspection problem why not let our consulting radiographers see what they can do for you? It will cost you nothing, may save you a lot. Call your local Picker* representative or write us outlining the situation.

He's doing the job with 50 curies of Iridium 192 carried in this TO412A mobile radiography unit.

Picker x-ray

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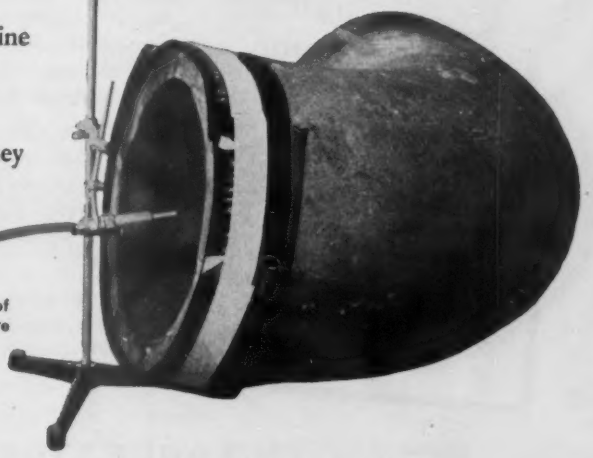

One "shot" radiographs the entire girth of the casting. Picker Flexible Film Holders are quickly taped on, quickly removed.

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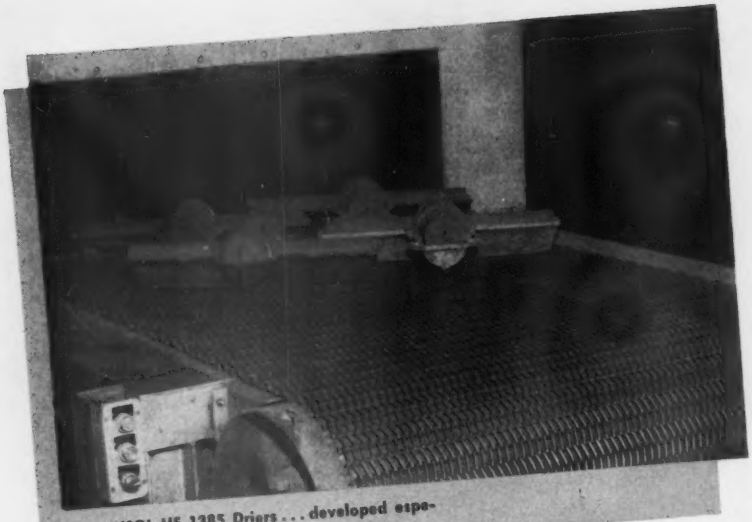

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for casting durable core driers

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HYSOL HF 1385 was developed by Houghton Laboratories jointly with Lebanon Steel Foundry for use in dielectric ovens. It is an entirely new approach to the problems involved of dielectric baking irregularly shaped cores.

HF 1385 is completely adaptable to any shape and form required without expensive tooling and the finished product is ready for immediate use without modification of any kind.

Get the full details on HYSOL HF 1385 in Houghton Laboratories Technical Data Bulletin Number T27. Write today

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third tap in the morning. The use of oxygen by the new process made it possible to raise this temperature well above 2700° F on the first and succeeding taps. A number of tests were conducted in one shop to determine the effect of oxygen on cupola metal temperatures. The temperatures were checked with an optical pyrometer at the spout. A record of the tests is given in the accompanying charts.

Fig. 3 illustrates the rate at which metal temperature can be increased, as well as how long it takes for the metal temperature to drop after the oxygen is shut off. Fig. 4 illustrates how quickly temperature can be recovered after an artificial unfavorable operating condition has been created.

In the course of this test, coke was reduced progressively until a very dark slag appeared. The coke bed height was down and the metal temperature quite low. Recovery after the oxygen was turned on was at a rate of about 12 degrees per minute.

Results Uniformly Good

Several foundries already have been using the NCG Controlled Cupola Chemistry Process over a considerable period of time, and the results have been uniformly good. From these results it has been found that, in certain foundry operations, oxygen consumption can be held down to a rate of 30 to 50 cu ft of oxygen per ton of metal produced.

A typical operating procedure to bring the first heat up to tapping temperature has been established as follows:

Oxygen is turned on about 1 minute after the air blast is started. It is supplied under a pressure of approximately 25 psi. If advisable, the air input rate may be reduced when the oxygen is used. Oxygen is supplied for a total period of 8 minutes, then shut off. At this point, normal operating procedures are re-established, and the first metal from the cupola is tapped as required by melting.

To supply oxygen, the control valve for each of the tuyeres should remain open. The throttle valve of the station control unit is then opened. A quick acting valve on the control unit then is opened slowly to admit the oxygen equally into all of the tuyeres. The throttle valve is adjusted to provide the desired operating oxygen pressure. To shut off the system, it is necessary only to close the station control quick-acting valve first, and then to close the throttle valve.

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powerful . . . versatile . . . easy to handle . . . economical to operate

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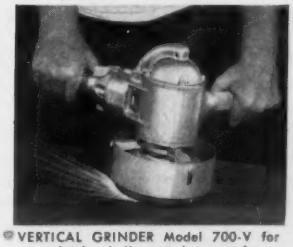
● HORIZONTAL GRINDER MODEL 700 for snagging, buffing, wire wheel work. Balanced design, easy to maneuver, weighs only 12 lbs. Wheel capacity: 6" - 8", RPM: 4500-6000, Model 600: 2½" - 6" Wheel, 9000 RPM, weighs 9 lbs.

● ABRASIVE BELT ATTACHMENT for fine finishing operations on flat or contour surfaces.



● VERTICAL GRINDER Model 700-V for cup wheel grinding on large surfaces, wire wheel work or flexible disc finish work. Wheel capacity 6", RPM 4500-6000, weight 11 lbs.

● MIDGET DIE GRINDER Model 200 — Precision tool for intricate grinding, filing and cutting. Speed 60,000 RPM. Collet Chuck ⅛" capacity.

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Airetool's new line of portable pneumatic equipment is designed for increased production, less operator fatigue and lower operating costs.

All tools are powered by Airetool's dependable pneumatic motor . . . the result of more than 27 years' experience in designing, developing and manufacturing pneumatic powered equipment. Airetool motors are smooth running . . . powerful . . . can handle the heaviest loads without stalling or heating up.

Operating parts are precision made from hardened alloy steel and an effective lubrication system prevents wear, increases motor service life.

Write for the new Airetool catalog No. 63 showing the complete line of Airetool grinders, sanders, drills and accessories

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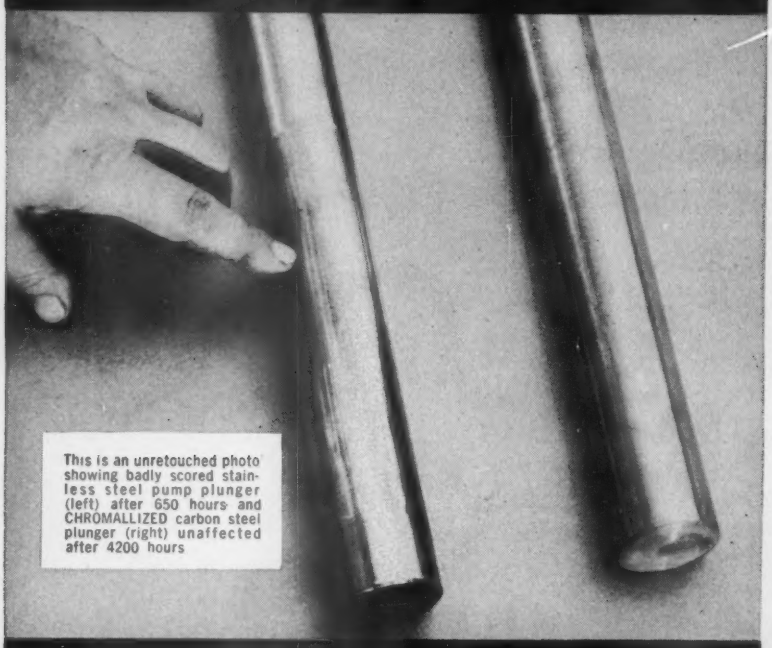
Do you use water pressure to clean castings?



This is an unretouched photo showing badly scored stainless steel pump plunger (left) after 650 hours and CHROMALLIZED carbon steel plunger (right) unaffected after 4200 hours

CHROMALLIZED POWER PUMP PLUNGERS LAST 2400 HOURS LONGER. COST 28% LESS

PLACE: Elyria Foundry, Elyria, Ohio.

APPLICATION: Vertical power pump generating pressures up to 2200 psi used to clean sand castings.

PROBLEM: Plunger abrasion from sand particles in the atmosphere.

SOLUTION: CHROMALLIZED carbon steel plungers.

Material	OLD PLUNGER 420 Stainless	CHROMALLIZED PLUNGER Carbon Steel
Price	a. (Purchase) $42.50	$75.00
	b. Regrinding (twice) $15.00	—
	c. Maintenance $47.50	—
	d. Total $105.00	$75.00
Service Life	(With 2 regrindings) 1800 hrs.	4200 hours

CHROMALLIZING is a patented chromium diffusion process which provides a surface as hard and wear resistant as chromium carbide.

Chromalloy Corporation is equipped to CHROMALLIZE your existing pump plungers or provide new replacement parts.

Chromalloy CORPORATION

450-A Tarrytown Rd. • White Plains, N. Y. • WH 6-0020

How Government Work Affects Your Employees

Standards You Must Meet On Federal Contracts

By Robley D. Stevens

ANY manufacturer doing work under a government contract with one of the federal agencies should know that such a contract is a complex document containing many requirements. In fact, failure to read and understand the basic labor provisions of a government contract can lead to confusion, financial loss, and, in some cases, unnecessary penalties.

Walsh-Healey Act — First, let us look briefly at what is involved in some of these problems. The Walsh-Healey Public Contracts Act applies to "any contract made and entered into by any executive department, independent establishment, or other agency or instrumentality of the United States for the manufacturing or furnishing of materials, supplies, articles, or equipment in any amount exceeding $10,000."

Next, the manufacturing government contractor should take care not to confuse the minimum wage, overtime provisions, or other requirements of the Walsh-Healey Act with the corresponding provisions of the Fair Labor Standards Act, which applies to employers engaged in interstate commerce or in the production of goods for interstate commerce or in occupations closely related to the production thereof.

Obviously, practically every foundry which must observe the Walsh-Healey Act requirements also operates under the provisions of the federal wage-hour law.

This leaves foundry management with the necessity of careful examination of the duties of its employees to see whether they are covered by a government contract.

Who Is Covered?—Among the types of employees engaged in or connected with the performance of a government contract—unless they meet the qualifications of an executive, administrative, professional, or supervisory worker under the federal wage-hour law—are the following:

1. Technical workers closely associated with the productive processes involved in the manufacture of products required by the government.

2. Laboratory technicians engaged

Circle 698 on Page 51

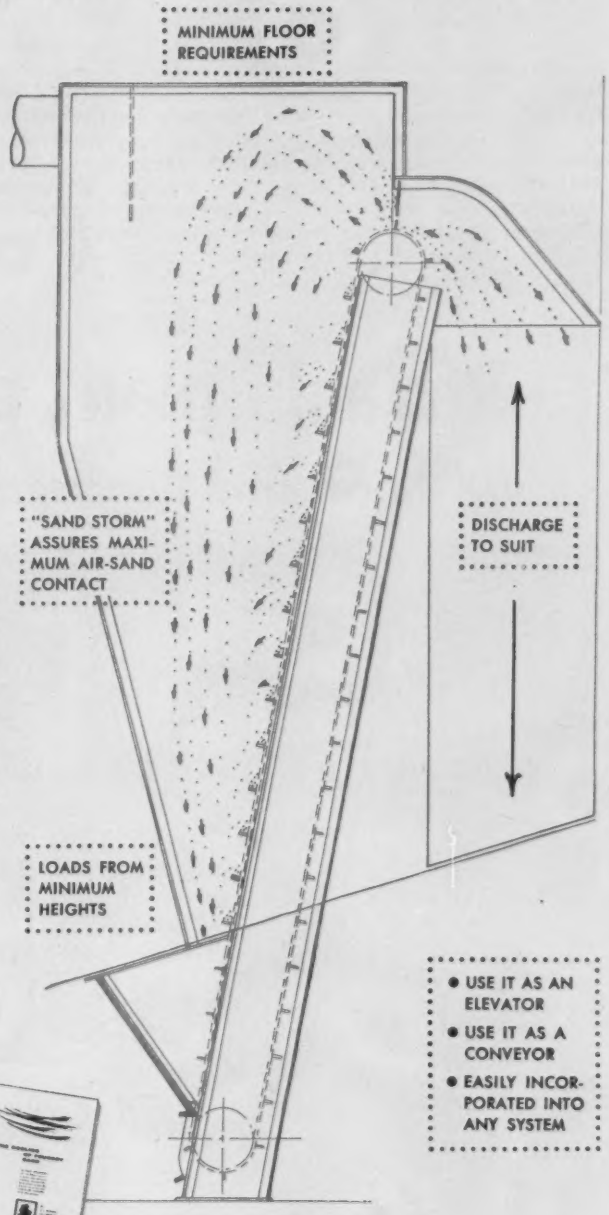
NATIONAL COOLEVAYOR

AT LAST...
a practical, low cost solution to Hot Sand problems

Foundrymen have long realized the need for a competent *separate*, yet economical device to cool sand before storage. National Engineers have devoted several years to the development of such equipment because they wanted to develop a unit that would meet these qualifications and cool sand *fast*.

The National COOLEVAYOR *is* fast, efficient and extremely compact. It requires little more room than an elevator. It can, in fact, be used in *place* of an elevator or conveyor. The design permits a maximum time for air-sand contact and a maximum area for heat transfer. You'll notice in the drawing at right that a virtual *sand storm* is created within the generous sized housing.

The result? Coolevayor is designed to cool shakeout sand to within the range of room temperature—as it enters the muller or storage bin. Temperature drops of 100° and more, from 200°+, have been experienced—even on days of high humidity.


MINIMUM FLOOR REQUIREMENTS
"SAND STORM" ASSURES MAXIMUM AIR-SAND CONTACT
DISCHARGE TO SUIT
LOADS FROM MINIMUM HEIGHTS
• USE IT AS AN ELEVATOR
• USE IT AS A CONVEYOR
• EASILY INCORPORATED INTO ANY SYSTEM

SEND FOR BULLETIN

What we found out about cooling foundry sand during development of the Coolevayor makes informative reading for *anyone* with a hot sand problem. That's why we have recorded these findings in a new bulletin entitled THE COOLING OF FOUNDRY SAND. A copy will be sent to you free, upon request.

See the COOLEVAYOR at the FOUNDRY SHOW.

ANOTHER! PROVEN PRODUCT OF THE PRACTICAL FOUNDRYMAN BY NATIONAL

NATIONAL ENGINEERING COMPANY

646 Machinery Hall Bldg. Chicago 6, Illinois

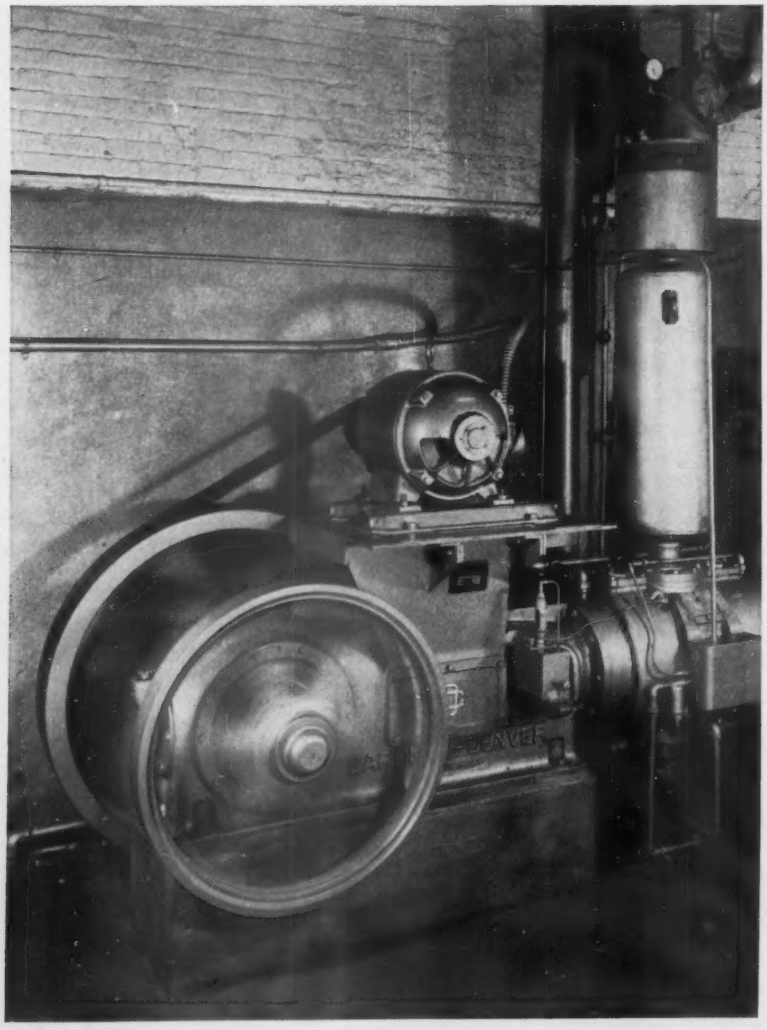
GARDNER DENVER

On the go day and night, Gardner-Denver RX compressors never tire, never lag. The sturdily engineered, dirt-free power end—that's one reason. Correct cylinder and valve design steps up compression efficiency. Fully circulating cooling water keeps operating temperature low. Get the full story on RX superiority for 'round-the-clock service. Write for Bulletin HAC-40 today. Gardner-Denver Company, Quincy, Illinois.

Stationary air compressors . . . tank-mounted compressor outfits . . . oil-free air compressors . . . whatever your compressed air needs, see your Gardner-Denver compressor specialist first. Gardner-Denver Company, Quincy, Illinois.

Reliable plant air

RX Horizontal Compressor



in testing materials used in the productive processes necessary to the manufacture of products to be supplied to the government.

3. Draftsmen engaged in the preparation of drawings and operators of blueprint machines engaged in making blueprints required to be supplied to the government.

4. Employees who make special dies and tools necessary for the performance of the contract, even though they may be regularly and currently engaged in similar functions on nongovernment work.

5. Tool designers who actually design on paper the tools and instruments to be used in the performance of the government contract.

6. Elevator men who operate elevators on which materials used in the government contract are moved from one floor to another.

7. Employees who clean machines or who remove waste and other accumulations resulting from the operation of machinery or other equipment used to fill the contract.

8. Shipping employees.

9. Employees examining or inspecting products to be supplied the government.

10. Time-study men who set the standard time or piecework operations performed on the contract.

11. Foremen supervising the performance of work on the contract.

12. Instructors of employees performing such work, including dispatchers and troubleshooters whose duties are to expedite the products to the places and at the time needed for the continuance of productive operations on the contract.

What Is the Minimum Wage?—The minimum pay required under the Walsh-Healey Act is not fixed by statute itself. Rather, the Sec-

" 'Why put expensive metal in the bonnet?' (quote) 'Think of the money we'll save!' (unquote)" . . .

retary of Labor is authorized to issue a minimum wage determination to be the prevailing minimum wage for persons employed in similar work, whether the employee is paid on an hourly, piecework, daily, weekly, or other time basis.

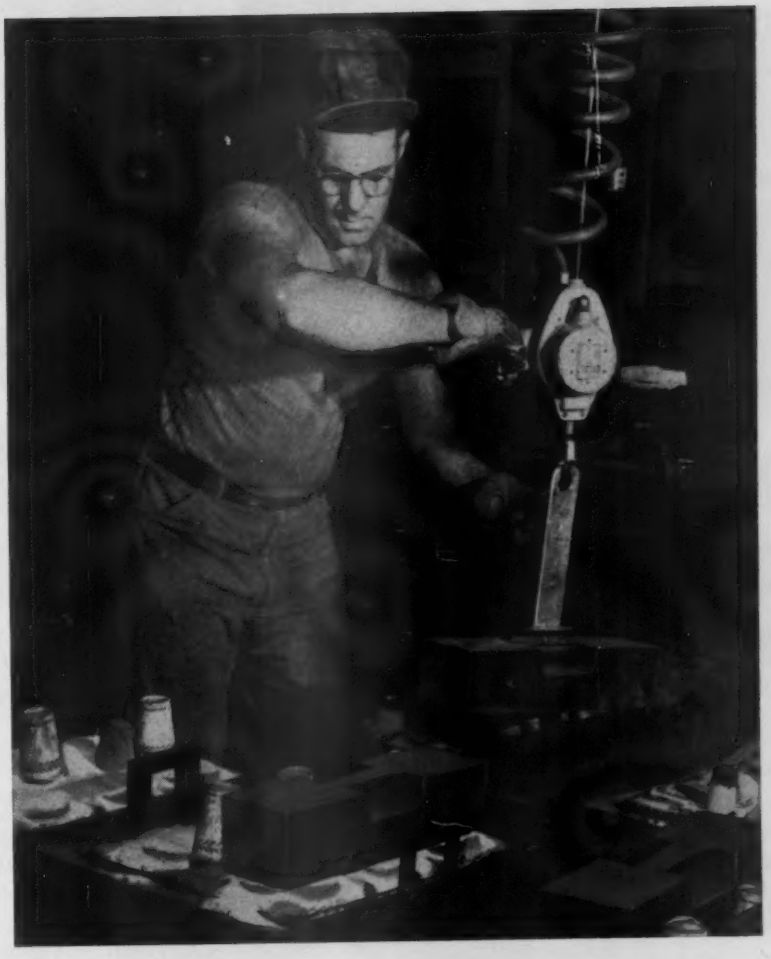
How To Figure Overtime Pay—The Walsh-Healey Act sets no limit on the number of hours in which an employee working on a government contract may work by the day or week. Overtime pay requirements provide for the payment of not less than one and one-half times the employee's basic or regular rate for all hours worked beyond 40 in the workweek or in excess of 8 hours in any one day, whichever yields the greater amount to the employee.

Child-Labor Provisions—Management also should make certain that it is complying with the child-labor restrictions of the Walsh-Healey Act, which prohibit employment of boys under 16 and girls under 18 on government contracts. Damages for violation may be assessed amounting to $10 a day for each day each minor is employed. You can protect yourself by having on file an age certificate for each minor, showing that he or she is at least the permissible age.

Safety and Health Standards—The Walsh-Healey Act specifically states that no part of a government contract may be performed under working conditions which are unsanitary or hazardous or dangerous to the health and safety of the employees engaged in the performance of the contract.

Record Keeping — The records your company must keep as a government contractor present no undue burden. No special order or form is required. The following items should be recorded: Name, address, sex, occupation, and date of birth of employees under 19 years of age. Wage and hour statistics by day and by week must be maintained for each worker. Such records must include, for instance, data on basic hourly rate of pay and total daily and weekly straight-time and overtime pay. The period during which each employee worked on a government contract also must be recorded. Records on injury frequency rates must be kept.

All such records should be preserved for at least three years from the last date of entry. In addition, you must display a poster, where your employees can see it, which briefly outlines the Walsh-Healey Act requirements.



Operator controls load

Hoist does all the work

To step up efficiency of its shell-molding production line, this foundry put a handy, lightweight Keller 86A-1 air hoist to work.

The hoist is mounted between two parallel conveyor lines. Operator controls the load with both hands . . . the hoist does *all* the work. It lifts and swings weights and trays from one conveyor to the other. Trays carry shell molds along the conveyor to pouring position. Weights hold the shell mold halves during pouring.

The 86A-1 provides a variable-speed lift . . . gentle starts and safe, accurate stops keep the job moving at a steady pace.

Gardner-Denver's line of Keller air hoists are available in capacities from 150 lb. to 2 tons. Write for Bulletin 80.

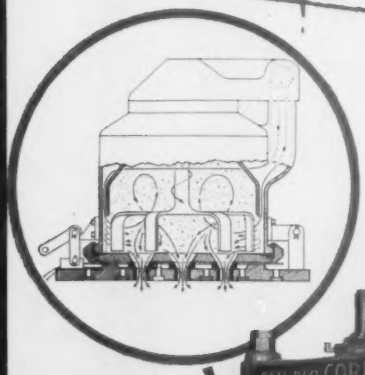
ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

STARS

by *San*



NEW

San-Blo MODEL 40

with more cost-cutting features than ever before

1. ***BLOWS ANY SAND*** . . . Exclusive sand chamber design permits the blowing of any practical sand mixture without piping, channeling, or sticking in the sand chamber.

2. ***ONLY ONE SAND CHAMBER NEEDED*** One size sand chamber blows cores from a few ounces up to approximately 40 lbs. with equal efficiency. No extra sand chambers needed.

3. ***BLOWS METAL, WOODEN or PLASTIC*** core boxes without elaborate rigging or reinforcing.

4. ***VALVES AND CONTROLS PROTECTED*** in a dust-sealed cabinet for long life and easy maintenance.

5. ***HEAVY, RUGGED CONSTRUCTION***

6. ***FAST CHANGE-OVER*** from job to job with *quick-change* universal blow and vent plate. Eliminates need for costly individual metal blow plates for each core box.

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Cut core-room costs on oil, air-set, CO_2, and other modern core processes

San-Blo Whirlmix®

SAND MIXER

Ideal for sands using CO_2, air-set, resin, and oil binders. Spring steel blades with replaceable wearing shoes provide exclusive "Rubbing Action"; mix fast and thoroughly without crushing or heating sand grains. Integral, totally enclosed, sealed drive unit, for dust-free operation, provides ample power for rated capacity. Three compact units: 120-lb., 375-lb., and 750-lb. capacities.

San-Blo Climax

WIRE-STRAIGHTENER

SAVE MONEY! Reclaim your used core rods and wires. Easy, safe, fast and foolproof. Range of sizes for wire diameters from 1/16" to 3/4".

San-Blo Vibra-draw

CORE DRAWER

SPEEDS CORE PRODUCTION. Vibrates and guides box on long, intricate draws. Floor or bench models.

Circle 702 on Page 51

Literature for Foundrymen

Cutoff Wheels

Description and characteristics of cutoff wheels are presented in Booklet PG-336. Wheels are available in resinoid, rubber, and reinforced resinoid bonds. The booklet also contains a section devoted to good cutoff practices with a table of suggested gradings of wheels for various operations.—**Products Division, Cincinnati Milling Machine Co.**, Cincinnati 9, Ohio.

For More Details Circle No. 461—Page 285

Steel Belt Conveyors

Complete line of hinged steel belt conveyors for handling castings, scrap, stampings, forgings, assem-

blies, and similar materials in heavy industry and warehousing is described in Catalog MF-100.—**May-Fran Engineering Inc.**, 1692 Clarkstone Rd., Cleveland 12, Ohio.

For More Details Circle No. 462—Page 285

Diecasting Machines

Eight models of diecasting machines varying from small, air-operated units to large hydraulic machines in both cold chamber and gooseneck models are described in detail.—**ABC Die Casting Machine Co.**, 400 East 142nd St., Dolton, Ill.

For More Details Circle No. 463—Page 285

Centrifugal Precipitator

Bulletin 276 describes a new medium efficiency, low-pressure-drop centrifugal precipitator used for primary dust collectors in pneumatic conveying; in primary dust collectors where atmospheric pollution will not be created; for reduction of dust loading, and reclamation of large sizes of dust in a dry state. — **American Air Filter Co.**, Louisville 8, Ky.

For More Details Circle No. 464—Page 285

Core File

Pamphlet describes advantages and lists sizes and prices of files said to cut time one-third in cleaning cores.—**Cleveland Lathe & Machine Co.**, 5400 Brookpark Rd., Cleveland 29, Ohio.

For More Details Circle No. 465—Page 285

Sandblast Machines

Bulletin describes cabinet sandblast machines for cleaning, deburring, surface preparation, stenciling, and matte finishing metal and other materials.—**Leiman Bros. Inc.**, 102 Christie St., Newark 5, N. J.

For More Details Circle No. 466—Page 285

Crucible Furnaces

Gas and oil-fired, mechanical and hydraulic tilt, crucible melting furnaces for brass, bronze, aluminum, and other nonferrous metals are presented in Bulletin 85.—**Stroman Furnace & Engineering Co.**, division of **Petersen Oven Co.**, 300 W. Adams St., Chicago 6, Ill.

For More Details Circle No. 467—Page 285

Hand Hoists

Complete line of hand hoists, available in 17 different lifting capacities from ½ to 50 tons, is described in eight-page Bulletin DH-164-C.—**Wright Hoist Div., American Chain & Cable Co.**, York, Pa.

For More Details Circle No. 468—Page 285

Photoelectric Controls

Catalog 58 describes and presents application diagrams and data on various types of photoelectric controls. — **Autotron Inc.**, Box 722R, Danville, Ill.

For More Details Circle No. 469—Page 285

Bandsaw

Specification sheet gives information on 18-in. saw for cutting metals, alloys, plastics, or wood at blade speeds up to 4200 feet per minute. —**Parks Woodworking Machine Co.**, Cincinnati 23, Ohio.

For More Details Circle No. 470—Page 285

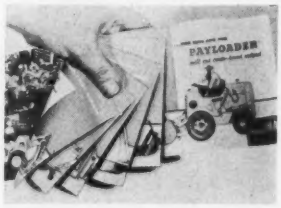
Sand Mixer

Mixer for thorough blending of core oil, resin, air setting, CO_2, and other sand binders, within 3 minutes or less, is available in three models. The Whirlmix mixer is described in Catalog WM-5.—**San-Blo Dept., Archer-Daniels-Midland Co.**, 2191 West 110 St., Cleveland 2, Ohio.

For More Details Circle No. 471—Page 285

Handling Savings

"Seven Ways To Cut Costs," a booklet demonstrating the value of interchangeable front-end attach-



ments on tractor-shovels, also includes specifications on Models HA and HAH Payloaders.—**Frank G. Hough Co.**, Libertyville, Ill.

For More Details Circle No. 472—Page 285

Magnesium-Ferrosilicon

Specifications for three magnesium-ferrosilicon alloys including two cerium-bearing types for use in producing nodular cast iron are available in a new four-page folder. Also listed are specifications of ferrosilicons for post inoculation of the iron. —**Electro Metallurgical Co.**, division of **Union Carbide Corp.**, 30 East 42nd St., New York 17, N. Y.

For More Details Circle No. 473—Page 285

Acetylene Generators

Details of design and operation of A-Twin continuous flow acetylene generators are given in bulletin. The units are intended to meet the demands of large industrial plants for acetylene at minimum cost and maintenance. Another

FOR MORE INFORMATION on Equipment, Supplies, and Literature described in this issue, mail one of these cards.

●

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342	372	402	432	462	492
343	373	403	433	463	493
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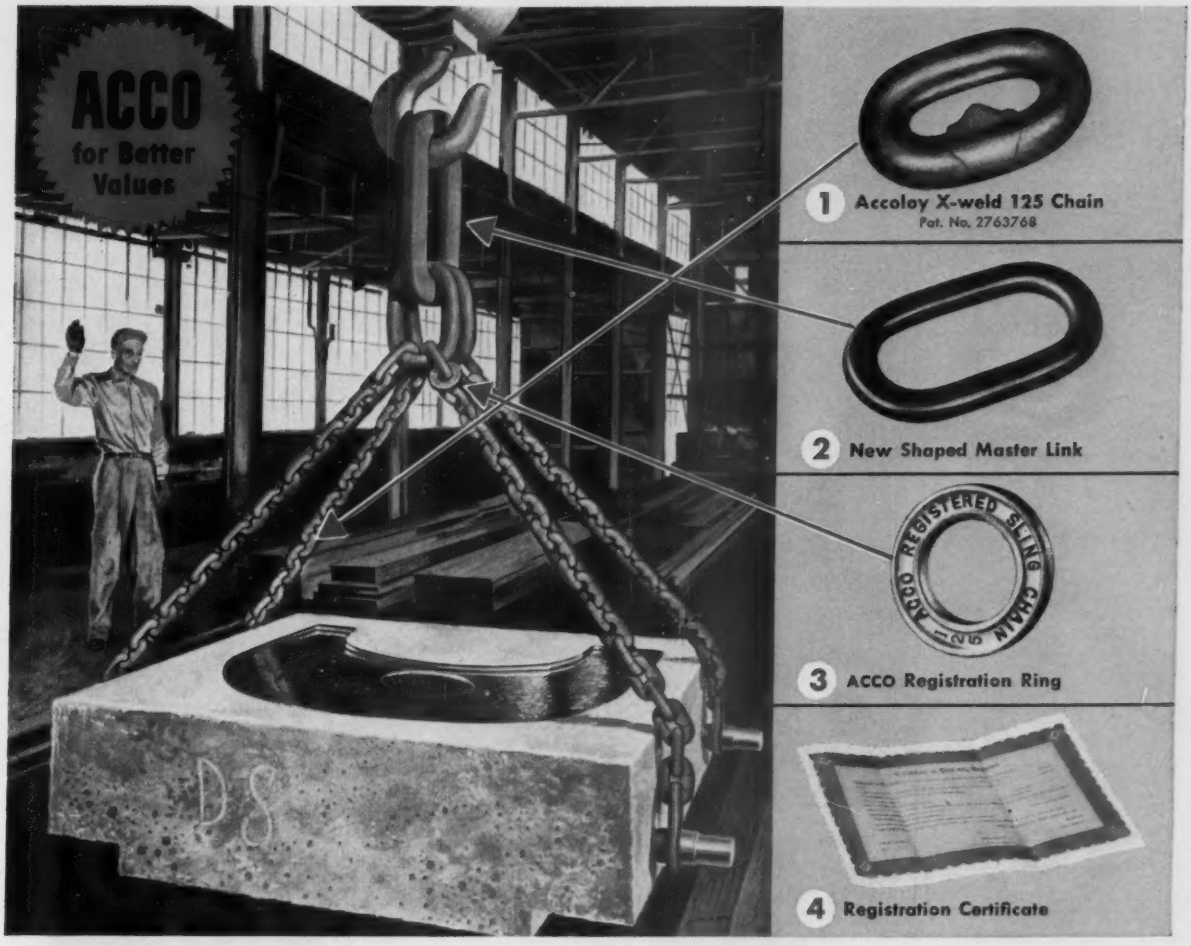

You get all these "plus values" in Acco Registered® Sling Chains

• When you equip your plant with ACCO *Registered* Sling Chains, you are getting slings of such *proved safety and efficiency* that they are the standard by which all other slings are judged! And, in addition, you get all these important, exclusive "plus values":

1 Accoloy X-weld 125 Chain • Where extra strength is desired in an ACCO *Registered* Sling Chain, the patented new Accoloy X-weld 125 Chain is used. Its king-sized welded area and non-kinking feature assure greater ruggedness and better service at no increase in price.

2 New Shaped Master Link • ACCO engineers have created the new Shaped Master Link which, without any increase in weight, holds its form under loads up to 18% greater than a standard round section can. This means extra security for your loads.

3 ACCO Registration Ring • The presence of this serially-numbered ring on an ACCO *Registered* Sling Chain shows that each component has been tested before assembly . . . that the assembled sling has been proof-tested to twice its working load limit . . . and that all tests have been successfully passed before registration of the complete sling and shipment from the factory.

4 ACCO Registration Certificate Every buyer of an ACCO *Registered* Sling Chain is furnished with a Registration Certificate signed by American Chain & Cable Company, Inc. This Certificate gives assurance that the sling meets ACCO's severe requirements of quality and proof-tested performance, and that it has been individually registered on ACCO's permanent records.

Tops in safety and strength

ACCO *Registered* Slings, with *Magnaflux-tested hooks*, give the best in strength, safety, service—and long-range economy. They are available through ACCO *Registered* Sling Chain Distributors in principal industrial centers. For full data, write us at York, Pa.

WHAT "ACCO REGISTERED" MEANS

1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification ring on each sling
6. Signed Registry Certificate with each sling

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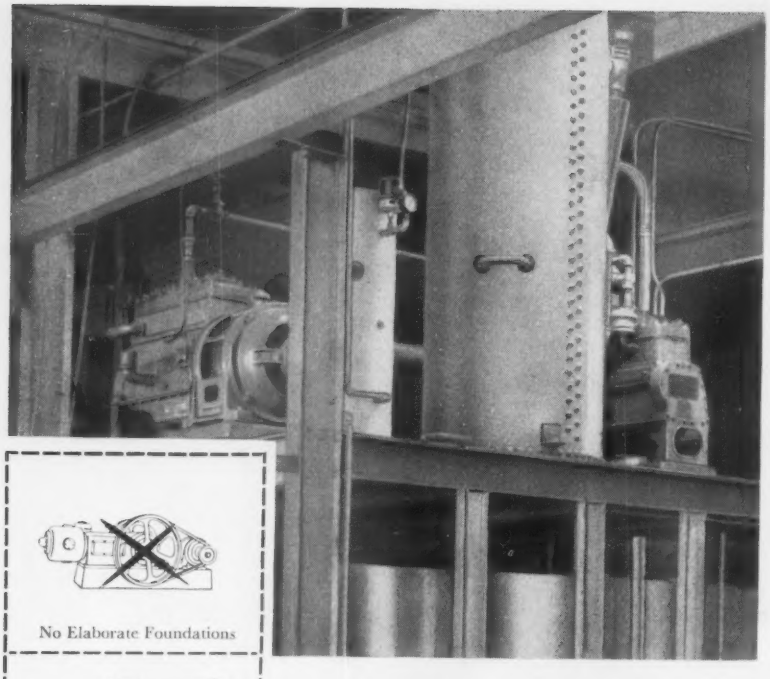
TRADE MARK

Circle 703 on Page 51



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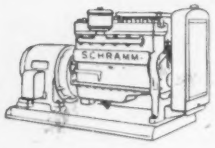
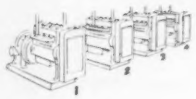
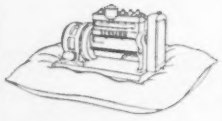


Compact



Unit System



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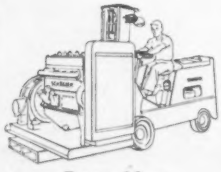
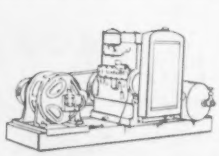


Easy to Move



Complete Package

AGAIN AT THE FOUNDRY SHOW, VIBRATION-FREE SCHRAMM COMPRESSORS SUPPLY THE AIR

When you visit our booth at the Foundry Show this year, you will see convincing proof of vibration-free operation. Our compressors have no elaborate foundations. In fact, they are so vibration-free that they don't have to be fastened down. Any floor space will serve as a base. Balanced reciprocating parts assure vibration-less operation, longer life. And vibration-free Schramm Compressors are easier on your building. Direct drive or V-belt driven to suit your exact needs.

Compact—Schramm Compressors take less space, can be located anywhere. Take advantage of unused corners.

Unit System—No need for costly centrally located compressors and long air lines. Use only the compressors you need—add to them as requirements grow.

No Vibration—Balanced reciprocating parts provide smooth operation, lengthen compressor life.

Easy to Move—Change the location of your compressor to suit your needs. Shorten your air lines. Meet changes in production plans.

Complete Package—All you need for your air requirements in a single package.

While at the Foundry Show, be sure to visit us at Booth 1851-1852

Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS

665 North Garfield Ave. • West Chester, Pa.

bulletin describes the smaller Model "A" for pipeline distribution to torch stations.—**Sight Feed Generator Co.**, West Alexandria, Ohio.

For More Details Circle No. 474—Page 285

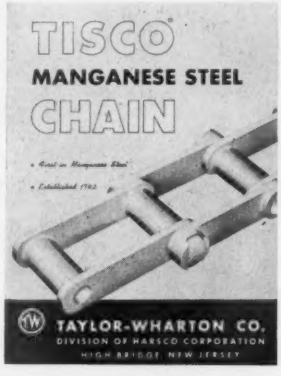
Repair Materials

Bulletin describes use of expanding iron cement, epoxy resin compound cements, and industrial maintenance kits for repairing various materials. A section covers use of epoxy cements for repair of pattern duplicates.—**Smooth-On Mfg. Co.**, Jersey City, N. J.

For More Details Circle No. 475—Page 285

Steel Chain

Catalog covers various types of manganese steel chain, including lightweight rivetless and detachable chains. Charts list dimensions for



each type and include data on ultimate strength, working loads, matching sprocket types, and special purpose attachments. Sprockets and traction wheels also are covered.—**Taylor-Wharton Co.**, a division of **Harsco Corp.**, High Bridge, N. J.

For More Details Circle No. 476—Page 285

Automatic Weight Control

Complete automation in continuous or batch processing operations, including record keeping, is discussed in Bulletin 0557 on the Select-O-Weigh system. Remote control panel operates feeders, scales, conveyors or other equipment used in proportioning, blending, or mixing materials. Punched card reader control permits automatic proportioning and mixing.—**Richardson Scale Co.**, Van Houten Ave., Clifton, N. J.

For More Details Circle No. 477—Page 285

Induction Heating

Publication entitled "3 Minutes with Induction Heating" explains what induction heating is and how

its use offers production economies in such applications as heat treating, metal joining, forging, and brazing. — **Magnethermic Corp.**, 3990 Simon Rd., Youngstown 7, Ohio.

For More Details Circle No. 478—Page 285

Sand Conditioning

Subject of a 12-page booklet is "The Cooling of Foundry Sand." It discusses basic principles, equipment, history, economics, and what is being done to provide improved methods and equipment.—**National Engineering Co.**, 549 West Washington Blvd., Chicago 6, Ill.

For More Details Circle No. 479—Page 285

Material Handler

Versatility of the R-18 Moto-Bug, which can be equipped as a fork lift unit, as a dump hopper or tail-

gate dump truck, a platform deck truck, a yard scraper, or as a hauling vehicle is described in four-page bulletin. — **Kwik-Mix Co.**, Port Washington, Wis.

For More Details Circle No. 480—Page 285

Wire Rope

"How To Be a Wire Rope Expert" is a guide in the selection of the proper rope construction for any job. The booklet also illustrates a means for determining the best ratio of rope size to sheave or drum size. Typical wire rope constructions and applications are described. —**Leschen Wire Rope Div., H. K. Porter Co.**, 2727 Hamilton Ave., St. Louis 12, Mo.

For More Details Circle No. 481—Page 285

Crucible Furnaces

Complete line of oil or gas-fired crucible furnaces for melting brass and bronze as well as other nonferrous alloys is described in an eight-page folder. Crucible capacities range from 250 to 2240 lb in

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brass. Lift-out type has crucible capacities from 150 to 400 lb in brass, and the bail-out type 200 and 400 lb in bronze and from 100 to 1120 lb in aluminum.—**Monometer Mfg. Co. Ltd.**, Savoy House, 115-116 Strand, London W.C.2, England.

For More Details Circle No. 482—Page 285

Sand Cleaning

A belt-type classifying device for cleaning sand is described in a section of Bulletin 39-C, covering classifiers, hydro-separators, washers, and heavy media separators.—**Hardinge Co.**, 240 Arch St., York, Pa.

For More Details Circle No. 483—Page 285

Vacuum Spectrometers

Principal details of the firm's Quantovac, a direct-reading vacuum spectrometer are presented in a four-page brochure. Use of an evacuated spectrometer chamber is claimed to extend the spectrum into the ultraviolet range and permit analyses for C, P, S, As and Se in addition to other elements. Instrument can be arranged to provide simultaneous analyses for 23 elements.—**Applied Research Laboratories**, 3717 Park Place, Glendale 8, Calif.

For More Details Circle No. 484—Page 285

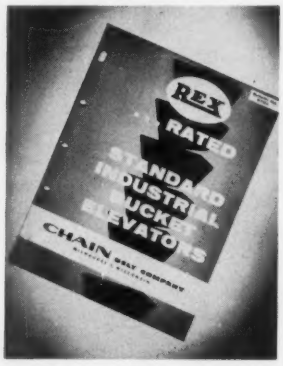
Crane Control Systems

Bulletin 9100 covers the selection and application of direct current crane control systems. Specifications, performance curves, component lists, dimensions, and other details of crane control systems also are included.—**Clark Controller Co.**, 1146 East 152nd St., Cleveland 10, Ohio.

For More Details Circle No. 485—Page 285

Bucket Elevators

Bulletin 5784 describes the complete line of Rex industrial elevators, including simplified data for selecting the proper equipment, drive selection data, and information for matching all components for their rated capacity. — **Chain Belt Co.**, Milwaukee 1, Wis.



For More Details Circle No. 486—Page 285

Coated Abrasives

Catalog gives sizes and prices of coated abrasives offered in bands, belts, rolls, sheets, discs, pyramids, and cones.—**Armour Coated Abrasives Division, Armour & Co.**, Alliance, Ohio.

For More Details Circle No. 487—Page 285

Electric Tools

Condensed catalog G8 describes electric tools and accessories. Included are drills, saws, grinders, chisels, and cutting wheels.—**Milwaukee Electric Tool Corp.**, 5316 West State St., Milwaukee 8, Wis.

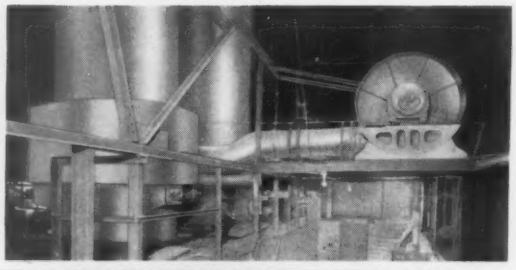
For More Details Circle No. 488—Page 285

Pyrometer

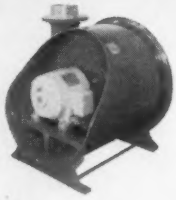
Specifications and typical wiring diagrams showing application of an

VITAL to any foundry

...a healthy heart



...and strong lungs



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That's why—where air delivery *must not fail*—you'll invariably find SPENCER blowers.

They have been first choice of leading cupola manufacturers and foundrymen for fifty years . . . and for sound reasons, including . . .

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- LOW MAINTENANCE
- RELIABLE OPERATION
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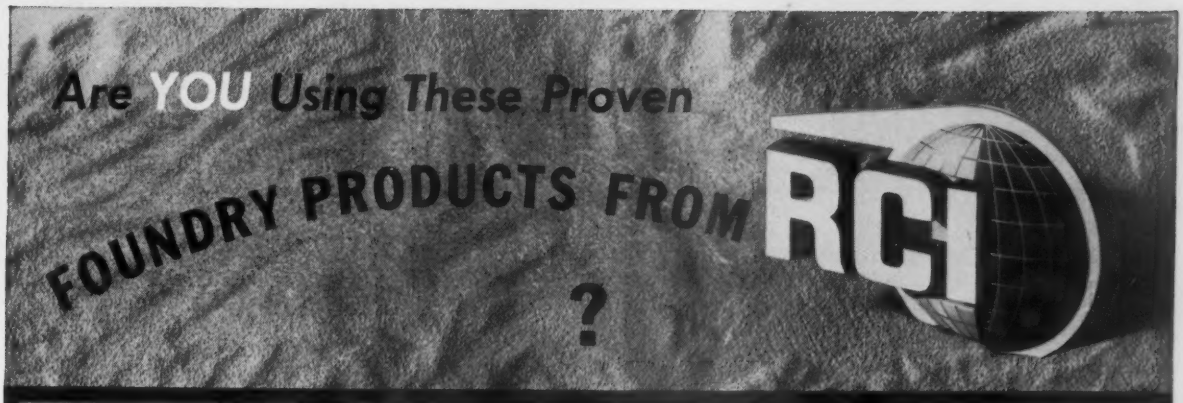
Circle 706 on Page 51



REICHHOLD PRODUCTS	TYPE	FOUNDRY PROCESS	OUTSTANDING FEATURES
FOUNDREZ 7101,7102,7103,7104	Liquid Resin	CONVENTIONAL CORES (Sand, Cereal, Binder, Water)	High Hot Strength High Baked Strength
FOUNDREZ 7600,7601,7605	Liquid Resin		Rapid Collapsibility Fast Bake
CO-RELEES 7300	Oil		Excellent Sand Conditioning
coRCIment 7990,7991,7992,7993	Oil		Broad Baking Range Excellent Workability
FOUNDREZ 7150,7151	Liquid Resin	SHELL MOLDS AND CORES (Dry Sand, Resin)	Unusual Stability
FOUNDREZ 7500,7504,7506,7555	Powdered Resin		Self-Activation
FOUNDREZ 7520	Granulated Resin		High Tensile Strength
COROVIT 7201	Powdered Chemical Accelerator	SELF-CURING MOLDS AND CORES (Dry Sand, Binder, Accelerator)	Non-Toxicity
COROVIT 7202	Oil		Excellent Flowability

For further information regarding any of these materials, write our Foundry Products Division at White Plains

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Circle 707 on Page 51

indicating-controlling pyrometer on electrically-heated, gas or oil-fired equipment are contained in Bulletin 3885.—**Illinois Testing Laboratories Inc.**, 420 N. LaSalle St., Chicago 10, Ill.

For More Details Circle No. 489—Page 285

Snagging Wheels

Snagging wheel handbook covers wheel shapes and specifications and discusses how to establish grinding costs, the proper handling of grinding wheels, proper maintenance, and safety rules. — **Peninsular Grinding Wheel Div., Abrasive & Metal Products Co.**, 729 Meldrum Ave., Detroit 7, Mich.

For More Details Circle No. 490—Page 285

Industrial Hose

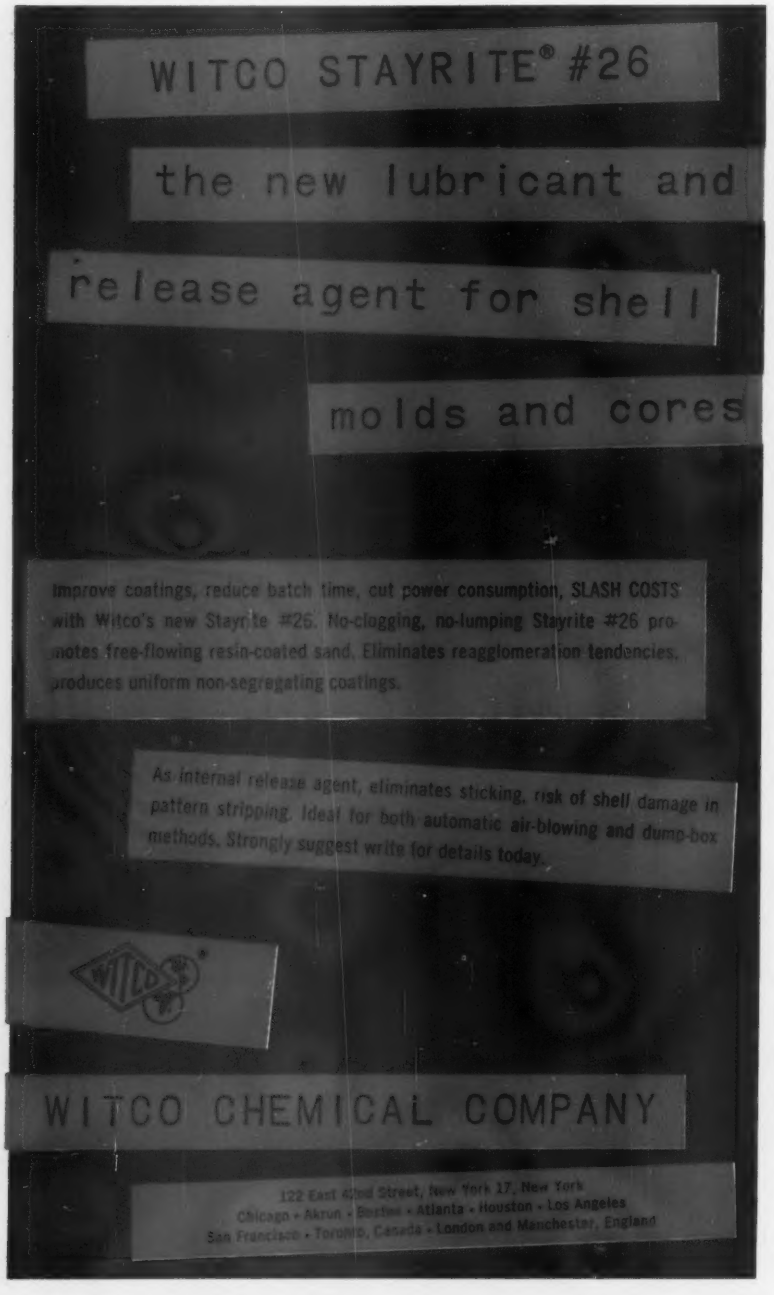
Most of the industrial types of rubber hose with detailed illustrations, construction data, service, sizes, pressures, weights, and fittings are described in catalogs M610 Air, M620 Water, M630 Steam, M640 Water Suction, M650 Petroleum, M660 Industrial Fire, M670 Spray and Welding, and M680 Special Service.—**Manhattan Rubber Div., Raybestos-Manhattan Inc.**, Passaic, N. J.

For More Details Circle No. 491—Page 285

Sand Mixing

Continuous mixing diagram shows an inexpensive way to condition green sand properly, with emphasis on dry premixing and uniform sand properties.—**Pekay Machine & Engineering Co.**, 865 North Sangamon St., Chicago 22, Ill.

For More Details Circle No. 492—Page 285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Improve coatings, reduce batch time, cut power consumption, SLASH COSTS with Witco's new Stayrite #26. No-clogging, no-lumping Stayrite #26 promotes free-flowing resin-coated sand. Eliminates reagglomeration tendencies, produces uniform non-segregating coatings.
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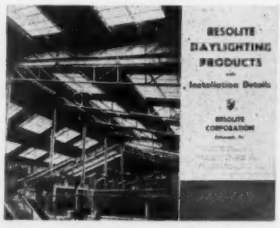
Plastic Panels

Catalog A.I.A. 26-A-9 contains general information, specifications, architectural and engineering details, suggested applications, and



other information on Fiberglas-reinforced plastic structural panels, skylights, and other plastic products.—**Resolite Corp.**, Zelienople, Pa.

For More Details Circle No. 493—Page 285

Refractories

Brand names of leading refractories manufacturers are tabulated in easy-to-read form under the headings of firebrick, cements, castables, plastics, and miscellaneous. Data are printed on letterhead-size stock for convenient filing and ready reference.—**Walsh Refractories Corp.**, 101 Ferry St., St. Louis 7, Mo.

For More Details Circle No. 494—Page 285

Pneumatic Automation Units

Air-powered, automatic production units for push-pull or rotary machine tool operation, and automatic air-operated tapping equipment, all with air and/or hydraulic controls are covered in bulletin.—**Renco-Toledo Inc.**, 3358 Alexis Rd., Toledo 13, Ohio.

For More Details Circle No. 495—Page 285

Welding Accessories

Catalog 11 illustrates and describes company's complete line of arc welding cable connections and accessories.—**Tweco Products Inc.**, Box 666, Wichita, Kans.

For More Details Circle No. 496—Page 285

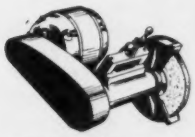
Over 60 YEARS of Service to Industry

GRINDERS • BUFFERS • DRILLS

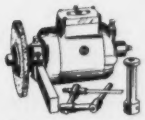
Drills
¼" to 1½"

Portable Grinders 1/3 to 7½ hp

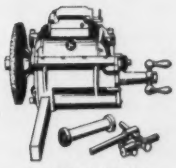
Swing Frame Grinder



Precision Lathe Grinder



Tool Post Grinder



Tool Post Grinder

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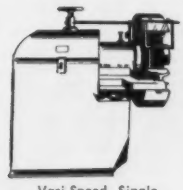
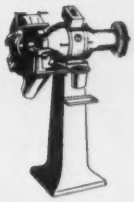
BOOTHS NOS. 1821-1823

THE UNITED STATES ELECTRICAL TOOL COMPANY
3646 Llewellyn Street, Cincinnati 23, Ohio

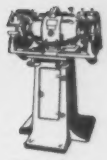


Vari-Speed Single or Dual Grinder

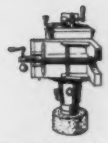


Grinder & Buffer

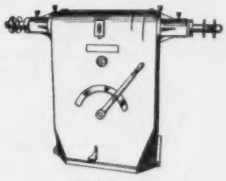
General Purpose Grinder



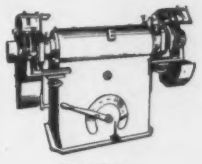
Direct Drive Grinder



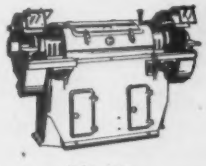
Vertical Spindle Grinder



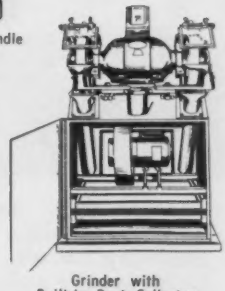
Buffer and Polisher



Gear Drive Grinder



Belt drive Grinder



Grinder with Built-In Dust Collector

Circle 709 on Page 51

Around the Country

NEWS REPORTS FROM

Chicago . . . Cleveland . . . Boston

Cleveland— Northeastern Ohio Chapter of the American Foundrymen's Society and the Cleveland Chapter of the American Society for Metals are co-operating with the Cleveland Technical Societies Council to present a metals and foundry show on a local television station Sunday, May 18, at 5:30 p.m.

Entitled "Breakthrough," the show is one of a series presented on station KYW-TV on the first and third Sundays from November through June. The series of programs was developed to present science and engineering with maximum viewer appeal and interest to attract young people to pursue careers and studies in these fields.

The May 18 program, dealing in large part with foundry operations, comes on the day before the opening of the 62nd AFS Castings Congress and Foundry Show in Cleveland. Much of the program will be keyed to that event.

On the same day at 6:05 p.m. the foundry industry will be saluted by Alex Dreier, radio and television commentator, on the nationwide NBC radio program "Monitor." His program also will tie in with the AFS Congress and Show and is one of a series called "America on the Go" sponsored by North American Van Lines Inc. of Fort Wayne, Ind.

Mr. Dreier's presentation will cover the history of the metal casting industry and particularly its rapid progress in recent years. A major purpose of the program is to acquaint about 9 million radio listeners with an industry that has been one of the least known and least understood in the country.

Boston— Not until late third quarter do gray iron foundries look for much improvement in casting demand. With meager backlogs and operations of three to four days a week, melt is not over 50 per cent of capacity. Most shops are not pouring better than 75 per cent on the days they operate.

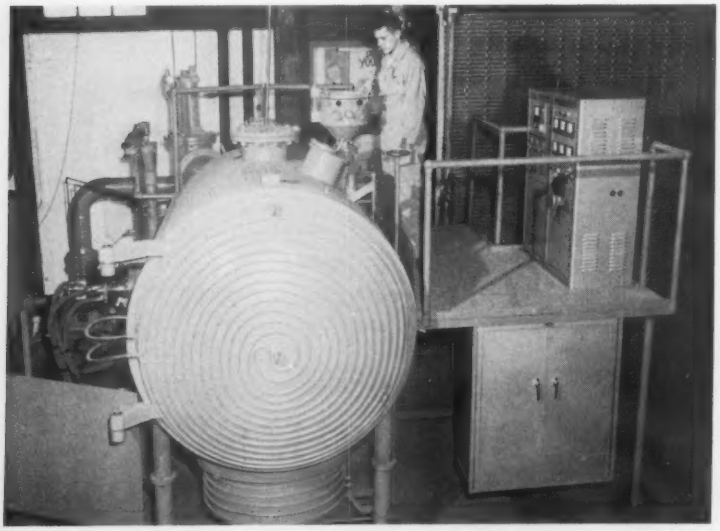
Malleable melt schedules are several points higher, but production for inventory is being cut back in several cases. Compared with gray iron producers, steel foundries are also several points higher, but backlogs are declining and deliveries improving. Ship propulsion equipment and heavy electrical volume is backbone of steel shop activity.

Gray iron jobbing shops are hampered by a decline in machine tool demand; mild improvement in bookings for cutting tools late last quarter has not reached foundries. Other users of gray iron castings have also cut back operations in New England, and casting requirements are down. Mild improvement in highway and construction intensifies competition from some of the captive mechanized shops.

Waterbury Farrel Foundry & Machine Co. is transferring its heavier machine assembly division to a new plant at Cheshire, Conn., but the gray iron foundry will continue at Waterbury. Sendzimir mill assembly operations will go to Cheshire, and for the first time in 100 years Waterbury Farrel equipment is being built outside the Waterbury, Conn., plant.

Pig iron contract prices for second quarter are unchanged by Mystic Iron Works at $68, furnace for No. 2 foundry. With an eye to low costs there is slight increase in ratio of cast scrap to pig iron in some foundry melts; top grade machinery cast at $50 to $51, delivered Connecticut, accounts for this situation and foundries are tightening on scrap specifications. The Tonawanda, N. Y., furnace normally supplying small volume of iron to New England melters is down for relining.

Shutdown of open hearth operations at Worcester Works, American Steel & Wire Co., by July 1, will scramble the scrap market in New England, notably steel grades. This will eliminate the largest consumer of scrap in the area, a source tending to maintain prices slightly high-



NEW RESEARCH TOOL: Battelle Memorial Institute, Columbus, Ohio, has placed a production-size vacuum furnace in operation in its metallurgical laboratory. It will be used for research aimed at improved alloys and high-quality castings. The new unit is capable of melting from 10 to 300 lb of metal at one time, and provisions have been made to permit semicontinuous production when it is required by research

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BIG and RUGGED

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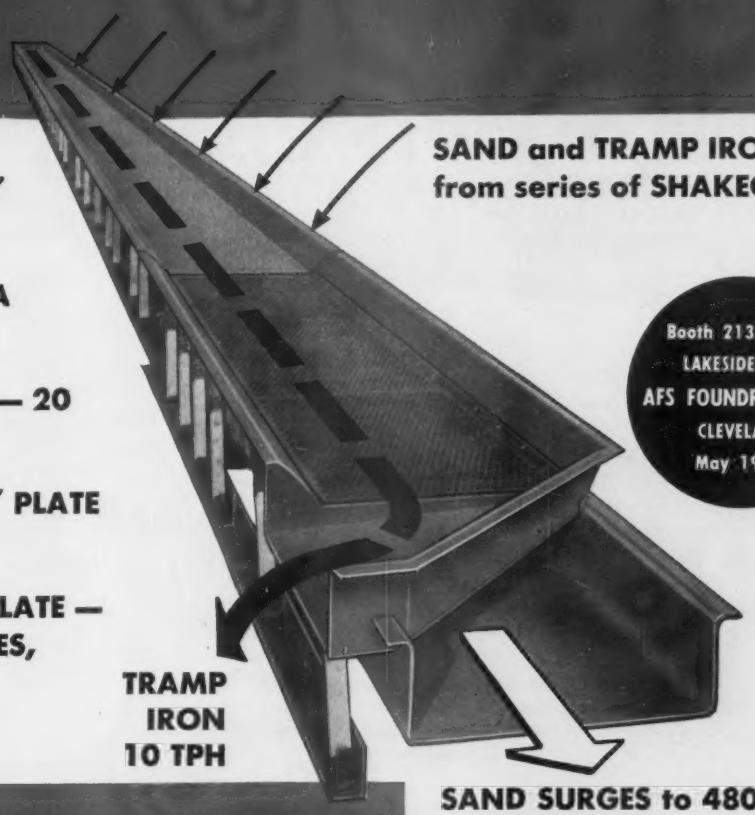
MEANS LONG LIFE, LOW OPERATING COSTS!



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- HORSEPOWER — 20
- TROUGH — 3/4" PLATE
- PERFORATED PLATE — 1" x 1 1/2" HOLES, 15' LONG

SAND and TRAMP IRON from series of SHAKEOUTS

TRAMP IRON 10 TPH

Booth 2133-2135
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SAND SURGES to 480 TPH

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er as a rule over shipping point prices to eastern Pennsylvania. In practice the Worcester consumer has established the price structure for steelmaking grades for other district buyers and indirectly for some cast grades.

Chicago—Harbison-Walker Refractories Co. held open house recently at its new Hammond, Ind., works where basic type refractories are now being manufactured for the steel, foundry, metallurgical, cement and glass industries. The plant is located on a 60-acre site on Kennedy St. between the Grand Calumet river and the Indiana Toll road.

The new Hammond facility began partial operation late in 1957. The fifth basic refractory plant built by Harbison-Walker in the last decade, it incorporates new concepts and improvements in equipment and layout and provides a highly mechanized and closely controlled operation. It provides excellent working conditions and assures maximum protection against occupational hazards.

Industrial growth in the Chicago area, particularly in steel production, led to selection of the plant location, which can serve all industry in Chicago and extensive Midwest areas through rail, truck or water shipments.

These same facilities bring required raw materials to the plant. Chrome ore comes principally from the Philippines and South Africa. Dead-burned magnesite is available from plants at Chewelah, Wash., and Cape May, N. J., as well as from a new plant at Ludington, Mich.

You get superior curing of shell molding materials with Heyden Newport technical grade Hexamethylenetetramine. It's available in three forms to suit your requirements —Granular, Powder and Flo Powder.

Hexa Granular is readily milled into the phenolic resin and is easily dissolved for liquid processes. Heyden Newport's Hexa Flo Powder is non-caking and disperses rapidly and uniformly.

For further information on the advantages and applications of Heyden Newport Hexamethylenetetramine call or write today. Wherever your plant is, you can rely on prompt deliveries from strategically located Heyden Newport warehouses. Heyden Newport Chemical Corporation, 342 Madison Avenue, New York 17, N.Y.

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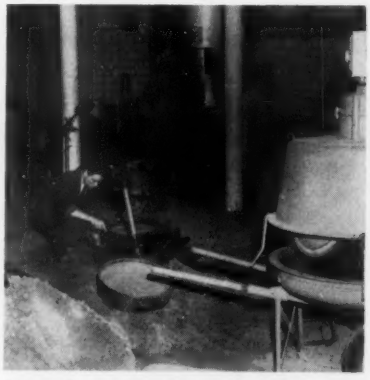
New Film on Education To Be Shown at AFS Congress

A new film, "Education and Our Industry's Survival," will be featured at a session to be sponsored by the Education Division during the AFS Cleveland Congress. The session is scheduled for 2:30 p.m. on Wednesday, May 21.

The film covers various phases



Scene from new film on education to be shown by AFS Education Division

of technical and vocational training, as well as foundry apprentice training, and explains their importance to the foundry industry. Its presentation will follow a discussion of the subject of education by a panel consisting of representatives of various foundry trade associations.

Buffalo AIME Group Sponsors Reactive Metals Conference

Under sponsorship of the Niagara Frontier Section of the American Institute of Mining, Metallurgical, and Petroleum Engineers, a Reactive Metals Conference will be held in Buffalo May 27-29. Dinner speak-

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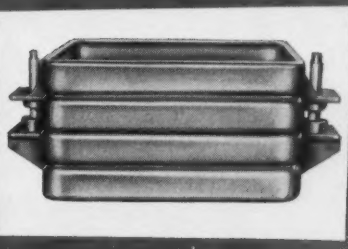
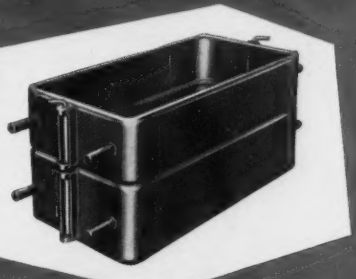


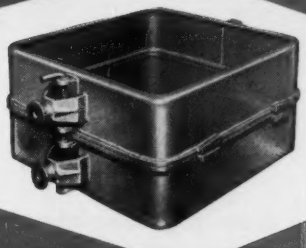
STYLE FP-16-C

Adaptable to all types of molding. Inside corrugation of ¼" walls for greater rigidity. Square or rectangular. Number of corrugations dependent on section depth.



STYLE FP-20

Medium heavy duty, of formed sand strips. Wall of ⅜" steel insures rigidity; solid bar reinforcement optional. Square, round, rectangular.

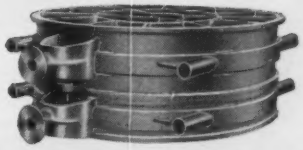


STYLE FP-21

Heavy duty. ½" or ⅝" walls, reinforced with solid bar rib. Min. depth 4", max. perimeter, 240".

STYLE FP-22-R

Extra heavy duty. For use where very rigid construction is needed; solid bar rib wherever required. Round, square, rectangular. ⅜", ⅜", ½" walls.



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Circle 712 on Page 51

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er on May 27 will be Dr. Henry Lee Smith Jr., chairman of the department of anthropology and linguistics, University of Buffalo, whose subject will be "Where Are You From?" Jerry Waterman, Consolidated Electro Dynamics Corp., Rochester, N. Y., will be toastmaster.

Technical sessions will be held during the first two days. These and the dinner will be at Hotel Statler-Hilton. Plant visits will be made on May 29.

Air Pollution Group Will Meet in Philadelphia May 25-29

The 51st Annual meeting of the Air Pollution Control Association will be held May 25-29 at the Sheraton Hotel, Philadelphia. Among the nation's leading authorities from the fields of research, industry, education and government who will address the meeting are Richardson Dilworth, mayor of Philadelphia; Arie J. Jaagen-Smit, California Institute of Technology; William R. Bradley, American Cyanamid Co.; Morris Katz, consultant to the Department of National Health and Welfare, Ottawa, Canada; and Louis C. McCabe, president, Resources Research Inc., formerly head of the Los Angeles Air Pollution Control District and now consultant to U. S. Public Health Service.

More than 50 technical papers covering a wide range of subjects will be offered. Surveys on air pollution recently completed in key areas, incineration techniques, basic and applied research on all phases of air pollution problems, automotive exhaust problems, and the public relations aspects of effective air pollution control administration will be covered.

Metallurgical Society of the AIME Elects New Officers

During the national convention in New York of the American Institute of Mining, Metallurgical, and Petroleum Engineers, the Metallurgical Society of the institute elected the following officers:

Dr. Walter R. Hibbard Jr., manager alloy studies research, General Electric Co., president; Dr. John Chipman, professor of metallurgy, Massachusetts Institute of Technology, vice president; T. D. Jones, American Smelting & Refining Co., Perth Amboy, N. J., treasurer; and Robert W. Shearman, secretary.

Directors include H. W. St. Clair, C. C. Long, C. S. Smith, J. B. Aus-

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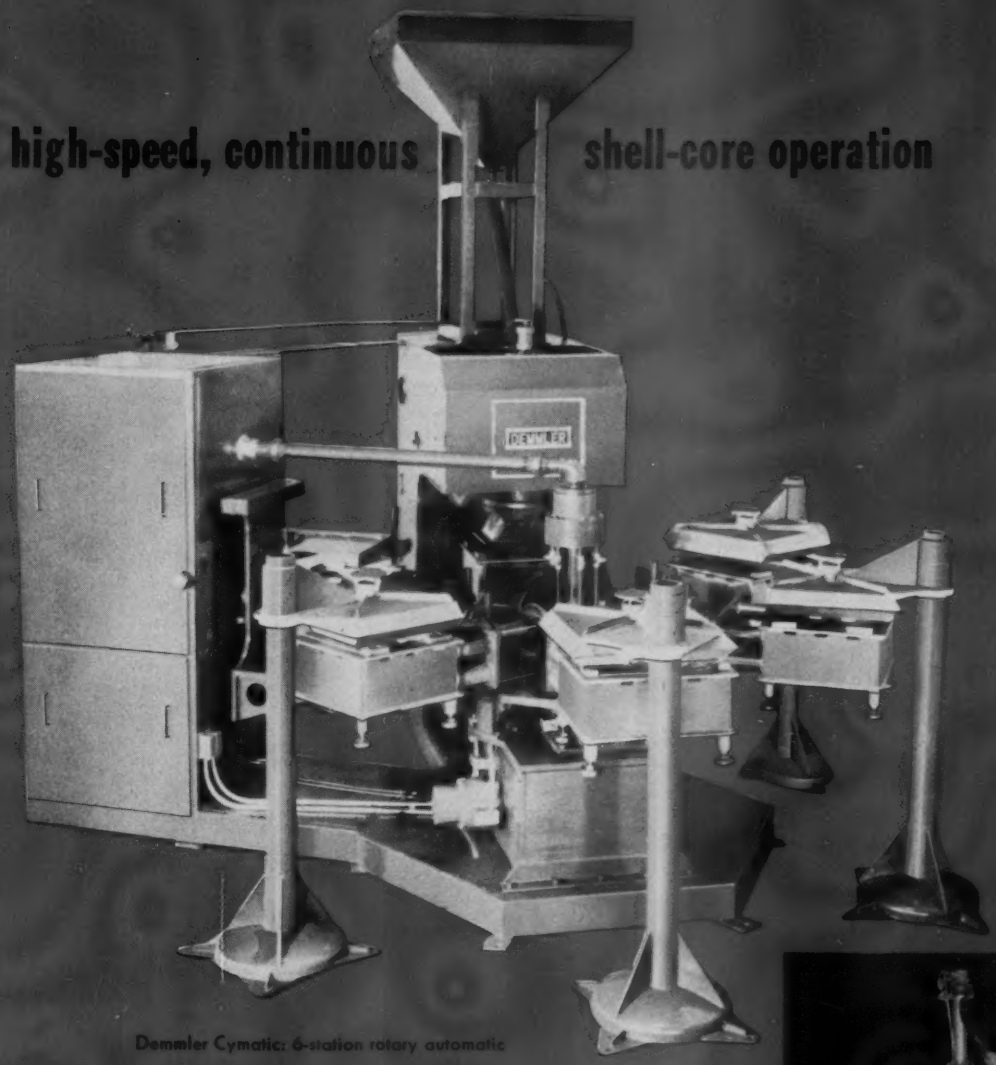

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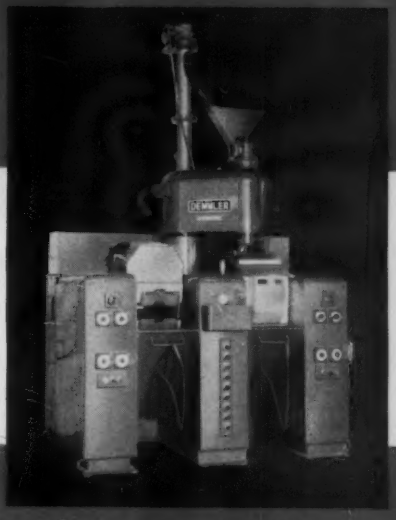
Precision shell-core equipment with new flexibility, new reliability, minimum investment



Demmler Cymatic: two-station automatic. Available in single-station models.

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- Standardized long-run core boxes
- Universal, quick-change blow plate
- Quick-change, pre-heated core boxes
- Precision heat-exchange on either half-box
- Vertical down-blow with horizontal and vertical ejection and mandrel draw

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Kewanee, Illinois

Circle 714 on Page 51

tin, J. S. Smart Jr., K. L. Fetters, H. B. Emerick, K. C. McCutcheon, H. H. Kellogg, W. J. Harris Jr., and F. M. Hamilton.

MIT Summer Session Covers Casting of Light Metals

A special summer program to be given at Massachusetts Institute of Technology, Cambridge, Mass., during the summer session, June 17-21, will cover Casting of Light Metals. This special summer program will deal with casting alloys of aluminum, magnesium, and titanium and with the important applicable foundry processes, including sand, plaster, permanent mold, and die casting.

The program is planned for producers, designers, and users of light metal castings and for teachers and research workers in the field. Tuition for the one-week program will be $200, due and payable on notification of admission. Academic credit will not be offered.

Program will be under supervision of Howard F. Taylor, professor of foundry metallurgy, and Dr. Merton C. Flemings, assistant professor of metallurgy. Other members of the MIT staff and guest lecturers will assist.

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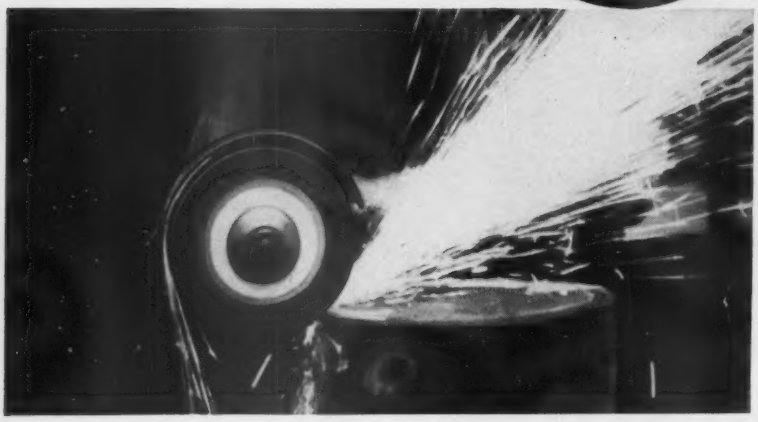

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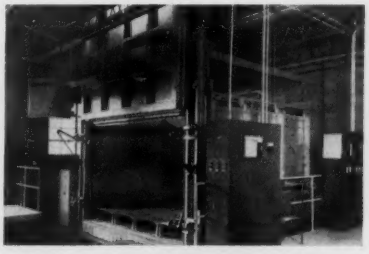
Provides New Facilities For Heat Treating of Flasks

Steel Treet Inc., Canton, Ohio, a wholly-owned subsidiary of the Shanafelt Mfg. Co., has recently completed modern and efficient facilities for stress relieving flasks and miscellaneous weldments. The company also anneals castings and case hardens bushings and pins.

The main unit is a new car-type furnace with 20,000 lb capacity, capable of reaching and holding temperatures up to 1800° F. The hearth



area is 12 x 12 ft; height is 7 ft. Modern excess air-type burners assure temperature uniformity and allow the maximum flexibility of furnace operation. Electronic controlling-recording equipment provides permanent records of each heat.

E. F. Houghton & Co. Opens New Plant in Detroit

New plant and laboratory facilities in Detroit have been completed by E. F. Houghton & Co., Philadelphia, at Lumpkin Avenue and the Detroit Terminal Railroad. They include new facilities for horizontal and vertical compounding and mixing, stainless steel tanks for chemical processing, and modern control and testing facilities.

The plant will supply additive-treated lubricants, cutting fluids of both petroleum and synthetic origins, drawing compounds, fire-resistant hydraulic fluids, rust preventives, heat treating salts, carburizers, hot forging agents, and quenching oils. Modern mixing, blending, and oil treatment equipment has been installed, and a fully equipped laboratory will exercise control over all processing.

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Moly makes it easy to increase strength of cast iron. Made at the spout, or in the ladle, small Moly additions require no change in the character of the charge, normal melting practice, or the base metal.

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If the use of Moly for high-strength iron isn't already standard practice in your shop, it will pay you to get the full story of how to upgrade iron, without changing normal practice. Write now for our series of bulletins "Why Moly Iron". Climax Molybdenum Co., Dept. 20, 500 Fifth Avenue, New York 36, N. Y.

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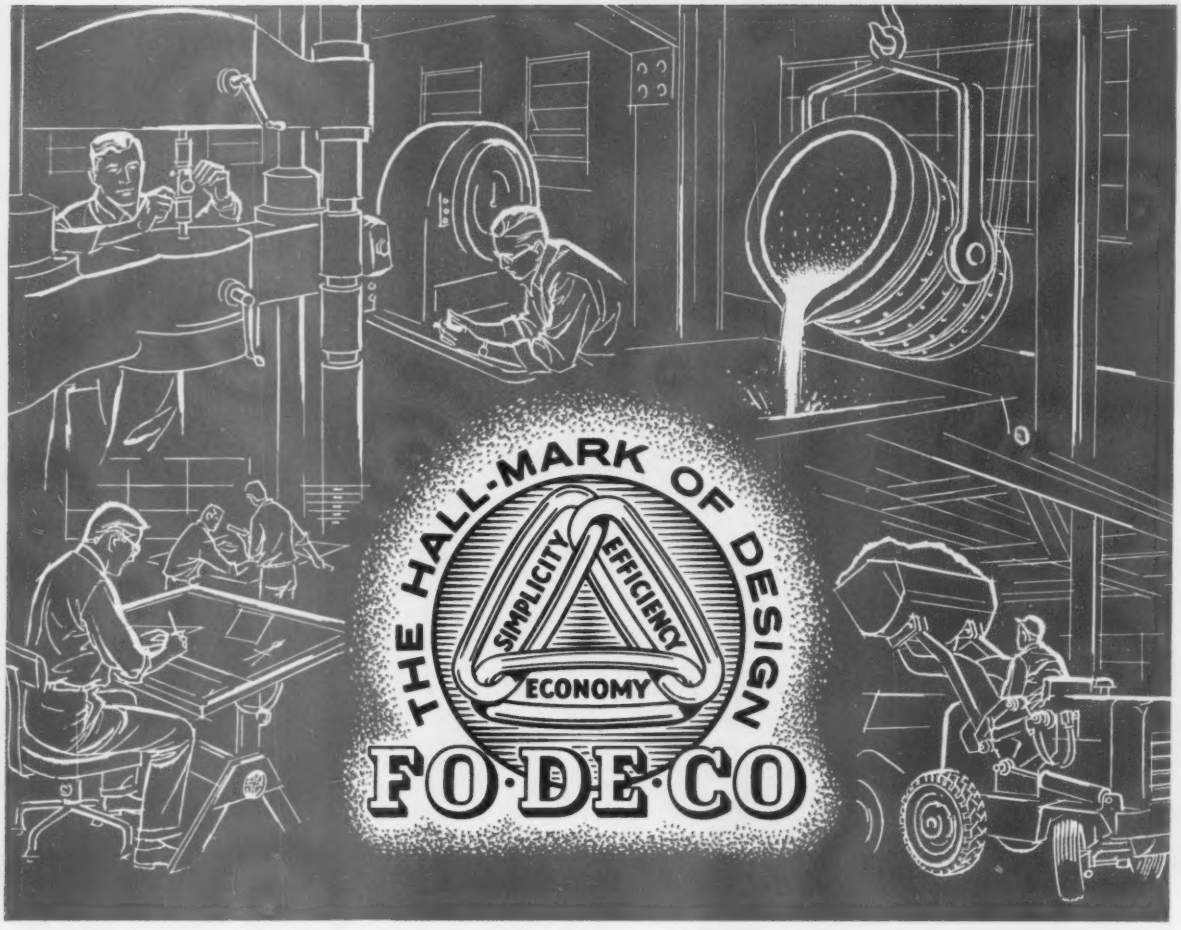
Circle 716 on Page 51



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Circle 717 on Page 51

Winners of the first MFS Redesign and Conversion Contest were, standing, from left to right, Jack L. Flitz; Joseph Beckham, for Neal Maranjo and Tony Martin; William T. Cole; and John R. Entenmann. Left to right, seated, are Norman V. Stickney; Lloyd E. Young, chairman of the Market Development Council of MFS; and L. D. Auker, who appeared for Hugh Pope

Malleable Founders

PUSH SALES EFFORTS

By JACK C. MISKE
Associate Editor

MALLEABLE foundries should step up efforts to convert weldments, stampings, and forgings to malleable castings. That advice was voiced repeatedly by speakers at the ninth Market Development Conference of the Malleable Founders' Society, at the Edgewater Beach Hotel, Chicago, April 9 and 10. Attendance was up slightly from that of last year's meeting.

The meeting was opened by Lloyd E. Young, sales manager, Superior Steel & Malleable Castings Co., Benton Harbor, Mich. Mr. Young is chairman of the MFS Market Development Council and acted as conference chairman.

The keynote of the meeting was sounded by P. C. DeBruyne, vice president, Moline Malleable Iron Co., St. Charles, Ill., and president of MFS.

Competition is the essence of our economic system, he said, and malleable foundries must compete. There are, however, great opportunities for all of them in the area of conversions to malleable of parts made by other forms of fabrication.

Sales Effort Has Lagged—This theme was enlarged on by George T. Boli, president, Northern Malleable Iron Co., St. Paul, in his discussion of "Creative Selling—for the Small Foundry." Mr. Boli pointed out that tonnagewise, malleable casting production has increased little or not at all since 1929, in spite of great increases in metalworking in general. He blamed this lag largely on failure of the industry to change its sales methods and goals.

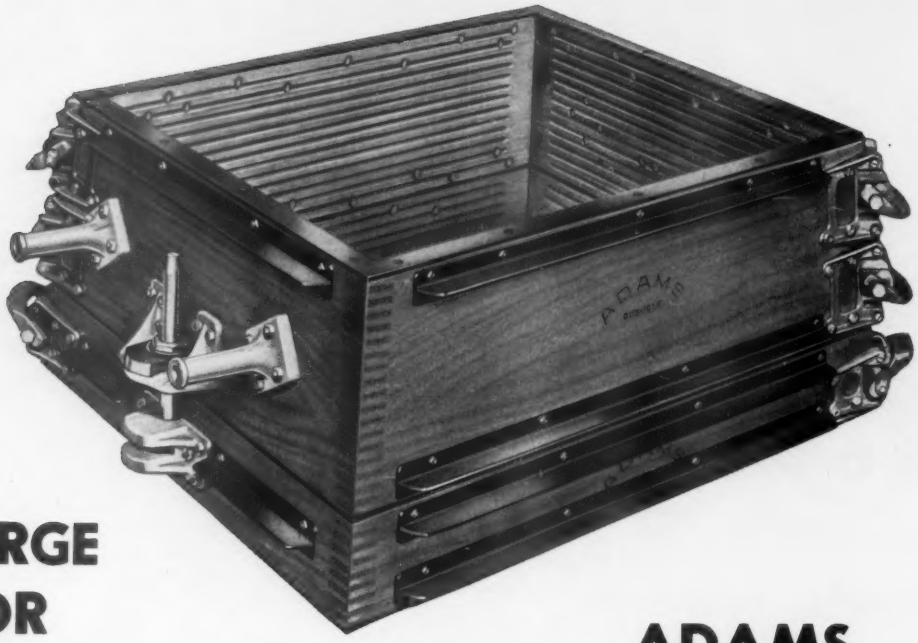
New customers are, he said, vital even to maintenance of business volume, and creative selling is the search for new casting applications. Salesmen must be replaced by sales engineers, who require the following characteristics: 1. A mechanical turn of mind. 2. A basic knowledge of their product, plant facilities, metals, and casting design. 3. Some design ability. 4. Insatiable curiosity about casting applications. 5. Patience and persistence. 6. Ability to discuss castings and their competition on a technical basis. 7. Thoroughness.

Mr. Boli urged that customers be aided in design work, preferably while parts still are on the drawing boards. Salesmen should take advantage of the new techniques and materials available and let their customers know of them.

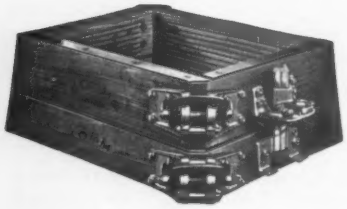
James H. Smith, general manager, Central Foundry Div., General Motors Corp., Saginaw, Mich., continued the call for aggressive selling through conversions. His topic was "Creative Selling—for the Large Foundry."

Industry Must Sell—The industry must realize, he said, that the era of order taking is over. Because it has waited for customers to come

Left to right, standing, Lloyd E. Young, conference chairman; and Lowell D. Ryan, MFS executive vice president. Left to right, seated, James H. Smith and George T. Boli, speakers on creative selling, and P. C. DeBruyne, president of the society



LARGE OR SMALL



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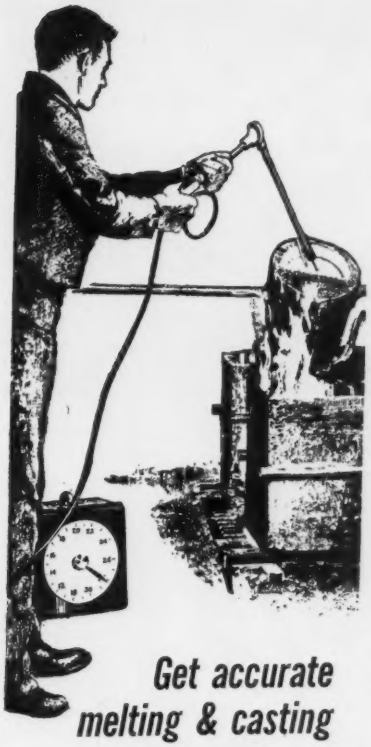

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Circle 719 on Page 51

to it, the malleable castings industry hasn't familiarized others with its products and processes. In these trying times, it isn't enough to cut operating costs; it also is necessary to get more profitable work—that is, to create sales. Malleable castings can replace many parts made by other forms of fabrication, Mr. Smith asserted.

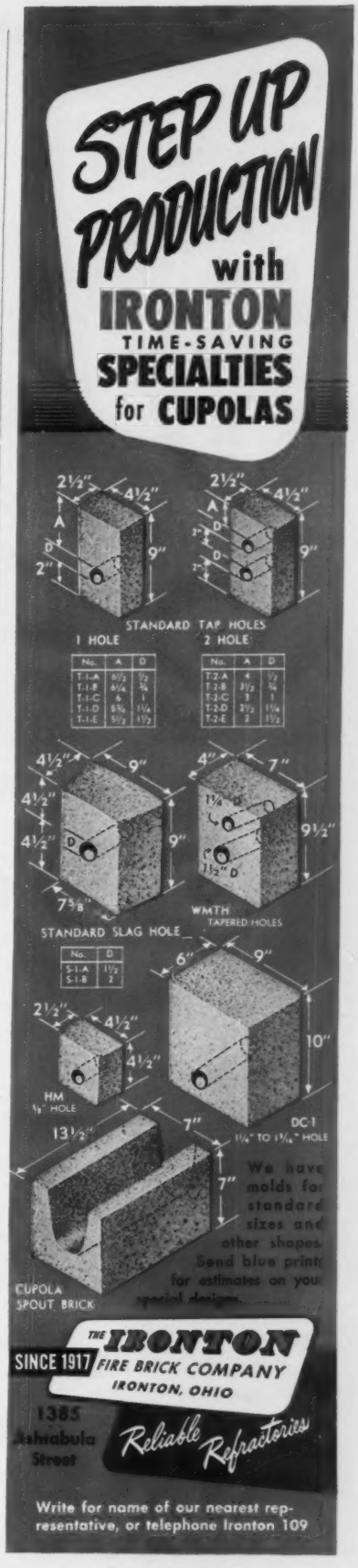
Casting sales of this type are not simple. Help and service to the customer are vital. The foundry should give him ideas, using the new methods and tools available. The best time to help is before a part is designed—which requires advance information from the customer on his new needs. A strong staff of sales engineers is needed for this sort of product development, to show that the industry can provide new advantages, cost reductions, higher strengths, and better designs. Basically, they must spearhead an educational program.

Closing his presentation, Mr. Smith described the Casting Design Conference series presented by Central Foundry Div. This series opened the way to new casting applications and provided better understanding of castings. As a result, it has made the sales job easier. (See FOUNDRY, March, 1958, p. 136.)

A film on effective research in the metalworking market closed the morning session.

Elevated Temperature Behavior— The afternoon session on April 10 was devoted to bringing salesmen up to date on new technical data to help them in their sales efforts. Lyle R. Jenkins, Wagner Malleable Iron Co., Decatur, Ill., discussed "Elevated Temperature Behavior of Malleable," which summarized results to date of a research project sponsored by MFS at Purdue University. These experiments indicate that malleable can be sold and used for higher temperature applications than usually thought. The tests have been designed to show how long standard and pearlitic malleable will hold a given load at a given temperature, particularly at 800° F and higher. Results have been good enough to support the belief that this work can open new markets to malleable castings. The MFS Research and Technical Council is preparing a paper for the ASTM meeting in June which will present results of the project. It is hoped that an ASTM specification on high-temperature applications for malleable will be forthcoming.

Machining Malleable — "Malleable Machining Characteristics" by



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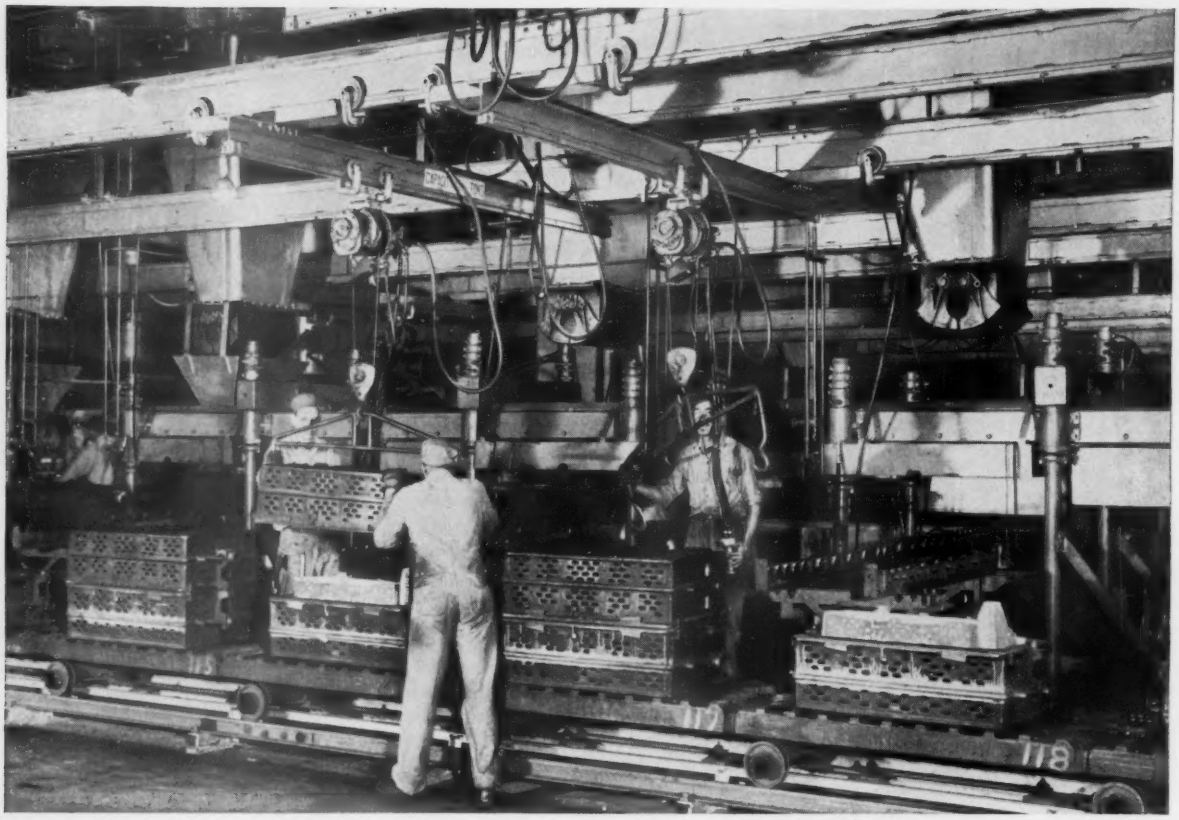

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Alnor

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

Circle 722 on Page 51

William C. Truckenmiller, Albion Malleable Iron Co., Albion, Mich., gave the meeting an advance look at some of the material which will appear in the machining section of the forthcoming malleable handbook. Mr. Truckenmiller discussed machining in general, then listed five objectives: 1. High cutting speed. 2. Surface quality. 3. Low force or power. 4. Well broken up chips. 5. Consistent dimensions. He showed how standard and pearlitic malleable compare with other ferrous metals on each of these points and explained how their machining characteristics can help to sell them.

This last point was amplified by L. L. Shafer, Central Foundry Div., in a paper on "Sales Value of Machining Data," which was prepared with the aid of G. J. Kramer, also of Central Foundry Div. A principal objective of sales, Mr. Shafer said, should be to persuade customers to look beyond original cost for other savings, especially in machining. Pearlitic malleable in particular seems to Central Foundry Div. to offer a great potential for new applications on this basis. The metallurgical composition, or "microstructure," of this metal is the chief cause of its superior machining characteristics.

Mr. Shafer cited these principal machining advantages of pearlitic malleable: 1. Increased productivity through higher speeds, feeds, and depths of cut. 2. Elimination of many semifinishing operations. 3. Elimination of many corrective straightening operations required when forgings are machined. 4. Reduction of capital investment because fewer machines are needed to do same volume of work. 5. Increased tool life and less maintenance. 6. Less trouble with chips. 7. Less power consumption. These points, he said, make better selling material than talking about the original price of castings.

A film on nodular iron also was shown at this session.

Contest Winners — Winners of the society's first Redesign and Conversion Contest were announced at the conference banquet on the evening of April 10. First prize went to William T. Cole, vice president, Canton Malleable Iron Co., Canton, Ohio. Second prize was won by Jack L. Flitz, Central Foundry Div., and Hugh Pope, Eastern Malleable Iron Co., Naugatuck, Conn., was awarded third prize. Fourth, fifth, and sixth prizes were won, respectively, by John R. Entenmann, Northern Mal-

In the tap hole area of a malleable iron furnace with metal tapped at 2840° F, *IRONTON* BERLITE mortar is ***more refractory than super-duty brick.*** When the furnace was shut down for repairs after running 16 hour heats, pouring 400 tons a day for weeks, we took the photograph above. The joints of *IRONTON* BERLITE stand out like a backbone along the brick sidewall.

TOUGHEST MORTAR YET

IRONTON BERLITE will outlast any fire clay material. For an actual photograph and service report on BERLITE in a really hot installation, write to our Special Products Division.

You can have on-the-spot consultation without obligation. Call or write Ironton to arrange for a visit by our experienced foundry engineers.

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Circle 723 on Page 51

The Arithmetic of Materials Handling

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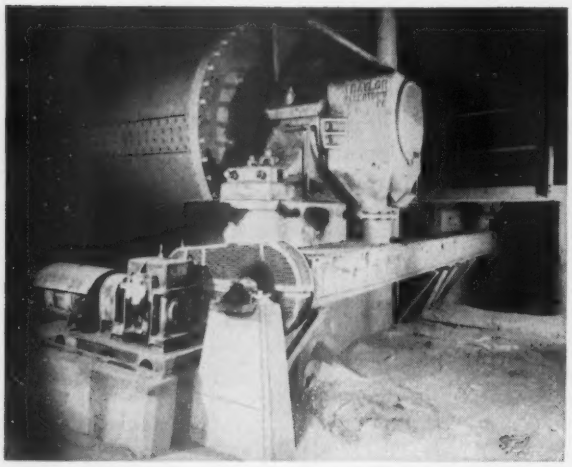
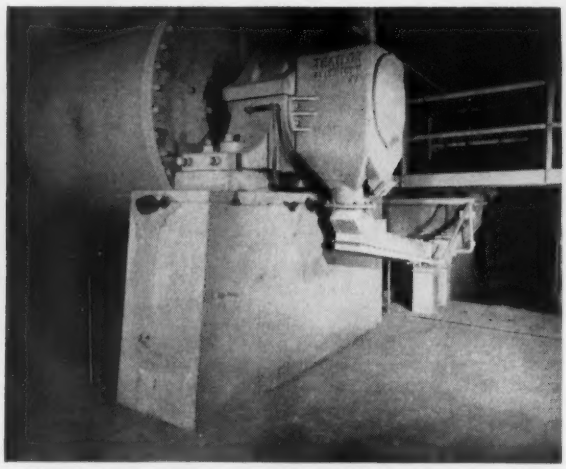


BEFORE: **Dirt, noise and mechanical breakdown** were constant problems in this cement plant, where two mechanical conveyors were used to collect raw materials. A 5 h.p. motor driving auxiliary equipment wasted valuable space and power, required frequent maintenance. Spillage clean-up wasted costly man-hours.



AFTER: **Clean, simple, quiet.** Notice the difference two 8" F-H Airslide® fluidizing conveyors have made. No dangerous moving parts. Nothing to lubricate. Auxiliary equipment and foundations are gone. Power needs are now only ⅛ of previous needs. Fluidizing saves wear and maintenance.

AIRSLIDE® Fluidizing Conveyor minimizes material loss . . . maintenance . . . moving parts

If you are now handling dry, pulverized materials, the F-H Airslide Fluidizing Conveyor can help you stop noise, and air-pollution, as well as speed flow and reduce maintenance cost.

Simplicity Itself

F-H Airslides fluidize dry, pulverized materials with low pressure air.

These materials literally flow at high speed, down the inclined conveyor. Power requirements are small.

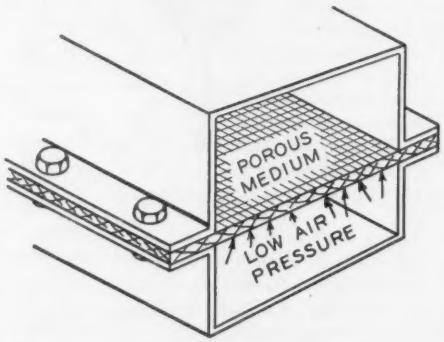
Flexibility, Low Cost

For unlimited applications, Airslide conveyors take up little space, and can be used singly and in combination with other Fuller pneumatic conveying systems. The movement of fluidized material can be around corners, between floors, through walls—nearly any conveying distance.

Better Housekeeping

Can Fuller conveying systems help eliminate your housekeeping problems—cut your maintenance and handling costs? Write today, outlining your problem in handling dry, finely-divided materials. Fuller will gladly make appropriate recommendations.

"Pulverized Materials Flow Like Water!"



AIRSLIDE PRINCIPLE: Porous supporting medium divides conveyor section into two "compartments". Dry material flows down inclined conveyor, fluidized by low-pressure air entering beneath porous medium.

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Circle 725 on Page 51

leable Iron Co.; Norman V. Stickney, Superior Steel & Malleable Castings Co.; and by Neal Maranjo and Tony Martin, Texas Foundries Inc., Lufkin, Tex.

As Others See Them—Three talks on the morning of April 11 centered on the theme "How Our Customers See Us." Roger B. Huffman, chief engineer, Duplex Truck Div., Warner & Swasey Co., Cleveland, spoke on "Malleable Iron—Its Application as an Engineering Matrial." He pointed out that the design engineer seldom comes up with a truly original design for industrial equipment. The customer actually determines what a product will be like, what it will do, etc.

The engineer must, he said, consider the available materials carefully, but each company has its own leaning toward the types of material and methods of fabrication it prefers. The engineer has a problem of selling management when his decision is away from these areas of preference. Accordingly the foundry can help that engineer to build a sales story to sell management its castings.

Mr. Huffman warned foundrymen not to try to reproduce a weldment in casting form when they are given a weldment to redesign. Instead, he advised, design a casting that will do the job. It probably will look better and be cheaper, and it also should be structurally stronger. Forgings offer a likely market for conversions because of their high die and machining costs, he said.

Howard Williams, director of purchasing, Eaton Mfg. Co., Cleveland, spoke on "A Buyer Looks at the Malleable Industry." He stated that an engineer decides on a casting, malleable or otherwise, because the facts he is handling indicate that it is the most functional part for the application involved. A problem arises in that his decisions are swayed by his background, which may be closer to stampings, forgings, or weldments. Thus the malleable industry and foundries in general have the job of educating design engineers. Foundries must be able to offer a better part and to prove its superiority to the engineer.

Foundries should get into the designing of parts as much as possible. Business is harder to get after a part has been set for some other form of fabrication. It is important to remember that the best possible part, regardless of cost, is not what the customer wants. He wants a part that will

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YOU KNOW it is false economy to buy refractory plastics if they dry out before you can use them. Foundries have solved this problem with the plastic that stays moist and usable for TWO YEARS..... **Ironton NOJOINT** in 550 pound steel drums.

YOU SAVE money when you buy in large quantity (palletized drums are available). You save freight costs on repeated small shipments. You save on day-to-day operations because **Ironton NOJOINT** does so many jobs more efficiently.

YOU CAN get **NOJOINT** out of the drum quickly and easily (we tell you how) and put it to work in ladle linings, cupola spouts, tapholes, slagholes and for patching the cupola well. While the plastic in drums or sliced in 100 pound cartons is most convenient to use, you will get excellent service also from **Ironton NOJOINT** dry in 100 pound bags if you prefer mixing it.

Ironton engineers will visit your foundry and show your men where and how to use **Ironton NOJOINT.** Write or call **today** for the latest bulletin and additional information.

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Circle 726 on Page 51

do the job at the least possible cost.

Casting salesmen should cultivate the assistance of customer personnel. Engineers tend to work with favorite suppliers, and it's up to casting salesmen to overcome this tendency. The malleable industry has not been strong enough in this effort. Its competitors in other forms of fabrication have been more aggressive and more active.

Mr. Williams also suggested that the customer, in his desire to keep prices down, is interested in the foundry's cost factors. When quoted prices are unrealistic, he advised, castings get designed out of consideration. The foundry must have an effective pricing policy and must stick to it. Otherwise it will lose business if prices are too high, or it will go out of business because its prices are too low.

Value Analysis—Final speaker at the session was Lawrence Miles, manager of value analysis, General Electric Co., Schenectady, N. Y., whose subject was "Value Analysis." Value analysis attempts, he said, to get the same performance in a part at vastly lower cost. It aims to cut costs one-third to one-half as a minimum, and reductions to one-tenth or less of the original cost are not uncommon. High cost is as undesirable in a part as poor performance. There is no relation between cost and value. Value is based on function and is the lowest cost of accomplishing a function reliably. Function involves two factors—what makes an item work, and what makes it sell. Any other cost element is waste.

Mr. Miles listed six factors which contribute to high costs: 1. Lack of information when a part is designed. 2. Lack of applicable ideas when a decision is made. 3. Temporary conditions governing decisions, without later changes when conditions change. 4. Honest wrong beliefs. 5. Habit. 6. Attitudes.

At the afternoon session, winners in the Redesign and Conversion Contest showed their prizewinning entries and explained the factors which led to sale of the successful castings.

The final speaker was William H. Gove, president, EMC Recording Co., St. Paul, whose subject was "I'll Swap Ya." The theme of Mr. Gove's talk was that selling is best described as a swap—a giving and a taking, an exchange of value to both parties. A film on sales work and its importance to the economy closed the meeting.

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Modernization through mechanization is the key to more profitable foundry operation. And Link-Belt, manufacturing industry's broadest range of equipment for handling sand, molds and castings, is in a unique position to help you plan and schedule a step-by-step improvement program.

Start anywhere. Whether it's the handling of sand, cores, molds, castings . . . or a completely integrated system—Link-Belt will furnish and install equipment that results in more efficient operation, lower costs and better working conditions.

And Link-Belt's vast engineering background assures expert analysis of your requirements. Our foundry specialists will work with you or your consultants. Call your nearest Link-Belt office, or write for Book 2423.

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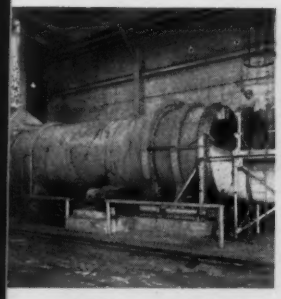
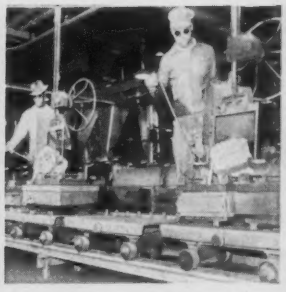
cost-reduction program through

mechanization

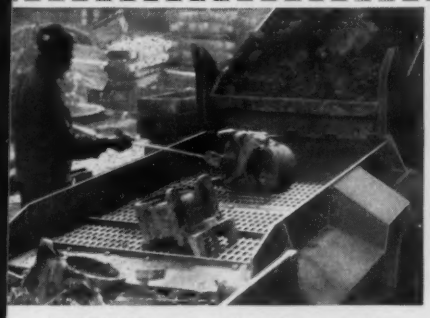


DRYERS — Link-Belt Roto-Louvre uniformly dries and cools large tonnages of sand in small space.

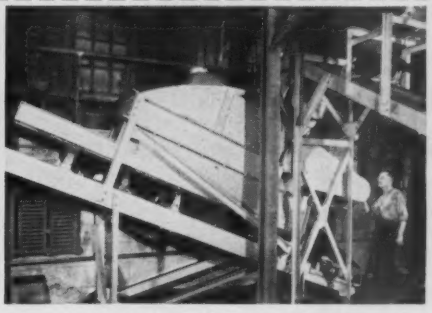


MOLD CONVEYORS — a full line of car, pallet, roller and trolley types meets all operational variations.

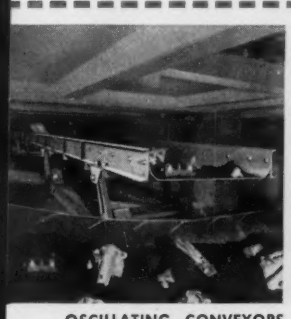
BELT CONVEYORS — efficiently move sand. Plows discharge sand to molding stations as required.



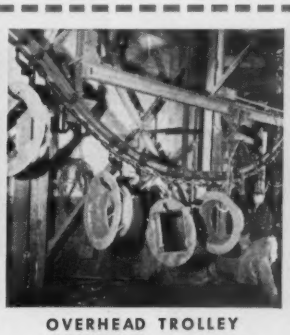
SHAKEOUTS — complete line provides high speed, economical separation of sand and castings. Rugged two-bearing vibrator imparts smooth circular motion to all screening surface.



REVIVIFIERS thoroughly aerate molding sand so that it will flow easily . . . assuring even distribution around the pattern. Revolving blades break up any lumps.



OSCILLATING CONVEYORS have full-time positive action—keep sand and castings moving regardless of surge loads.



OVERHEAD TROLLEY CONVEYORS economically move cores, molds and castings, with complete flexibility.

WRITE FOR BOOK 2423 —Gives detailed information on Link-Belt's complete line of foundry equipment.

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LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 14,863

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Circle 727 on Page 51

Employer Can Waive Shop Rights to Inventions

Contract Will Supersede Normal Implied Claims

By Albert W. Gray

DISCOVERY and perfection of a process for the manufacture of multiple metal molds for use in electrotyping by a foreman in an engraving and electrotyping plant in Ohio, was followed by an agreement between this employee and the company.

Under this invention, which the employee had patented, a number of molds were assembled in a frame from which a single electrotype plate was made, simplifying and reducing the printing cost by a composite plate.

The agreement provided that the employee would receive from his employer a royalty of 10 cents per unit of the assembled molds sold. For a short time he received these royalties, then payment stopped.

In the suit by the employee for the recovery of the agreed royalties the employer contended in its defense that the invention covered by this patent had been planned, designed, and executed at its workshop, with the facilities of the employer and on its time for which the employee had been paid by the employer.

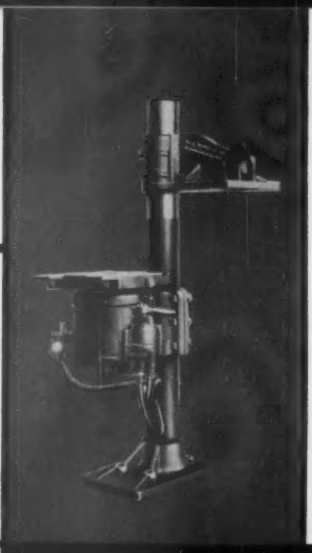
Brains Not Sold—In its definition of the rights of the employer in the invention discovered and perfected by the employee, the court quoted a comment one time made by a Federal court, "There is some popular notion that so far as concerns inventions, employees sell their brains to their employers; but that is not the law.

"On the contrary, the Supreme Court has thoroughly established that while certain shop rights in inventions made by an employee while engaged in the work of his employment may accrue to the employer, no title thereto passes unless there be a plain, unambiguous contract obligation by the employee to turn it over to his employer. Only by such a contract can title to the employee's invention be obtained."

Of the shop right here and the employer's claim of ownership of this invention, irrespective of any assignment that might have been made to it by the employee, the court made the definition,

"A shop right is a right which, under certain circumstances, the

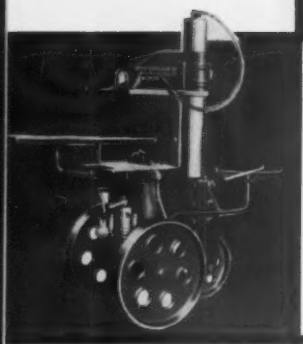
for half a century the *best* in molding equipment . . .



Stationary Type 10F ▶ Jolt Squeezer

10" diameter squeeze piston with integral cast top, cast steel squeeze head, heavy duty 3-way operating valve, single lever control. Adjustable mold shelf and riddle rack optional.

NICHOLLS
MOLDING MACHINES



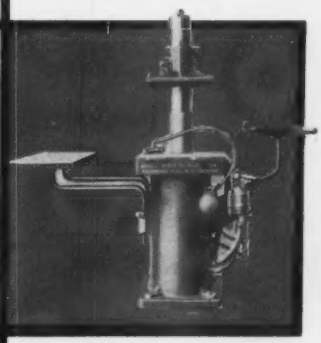
◀ Portable Type 10F Jolt Squeezer

With adjustable mold shelf and riddle rack, blow off valve and 5/8" vibrator attached. Air is connected at top of column, eliminates complicated piping.

Large or small, stationary or portable, manual or automatic, Nicholls Molding Equipment is precision engineered to give you better molds at lower costs . . . to eliminate dangerous risks, save manhours, increase production.

Stationary Type 11F ▶ Jolt Squeezer

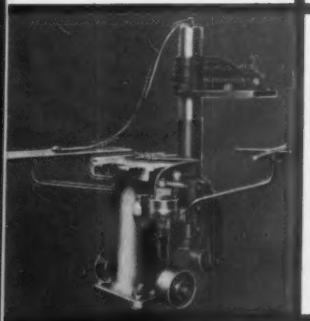
11" diameter squeeze piston. Double extra heavy steel pipe, closed top and bottom, serves as air reservoir and water trap. Plug at bottom drains out water and dirt.



Nicholls assures you of

- **consistent high quality molds**
- **continuous mold production**
- **cost-saving molding efficiency**

backed by scientific know-how, years of experience.



◀ Portable Type 11F Jolt Squeezer

Squeeze pistons are ground smooth and accurate to size and fitted with a composition packing ring to insure durability and tightness under pressure. Guide pins and bushings are steel hardened and ground.

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Whatever your requirements, you can depend on Nicholls for the right molding equipment to fit your specific needs. Take a look at **your** equipment and write, wire, or phone for more information, detailed specifications and prices.

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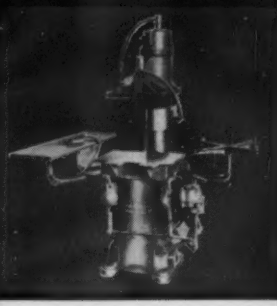
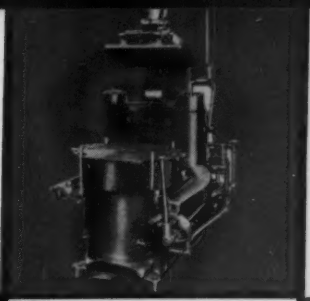
Stationary Type 12F Heavy Duty Jolt Squeezer ▶

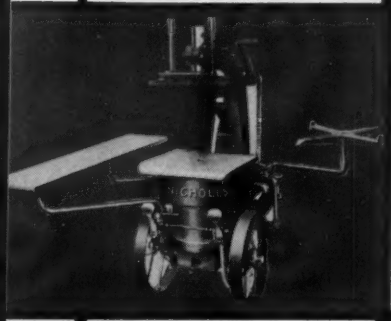
12" diameter squeeze piston, adjustable mold shelf and riddle rack, blow off valve and 5/8" vibrator. Jolt easily regulated for long or short strokes. Knee jolt optional. Also available in a portable model.



Type 14PL Jolt Squeezer, Adjustable Pin-Lift ▶

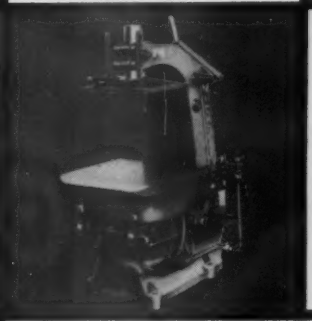
Fast, accurate draw . . . sharp clean molds. Squeezing mechanism has protective feature that insures head will be in squeezing position before control valve is operated. One-piece, heavy cylinder and base support assure permanent alignment.





◀ **Portable Type 10M Jolt Squeezer**

Simple rugged construction. Squeeze head operated to and from squeezing position with ease. Interlock insures head is in squeezing position before valve will operate. Adjustable mold shelf and riddle rack attached.

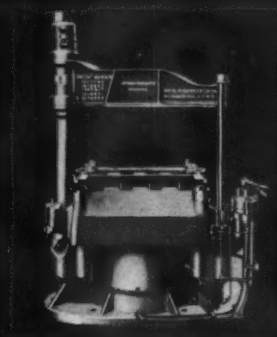


◀ **Stationary Type 16M Heavy Duty Jolt Squeezer**

Also available with a knee operated jolt valve, the squeeze valve on this machine will not operate until the head is in squeezing position. Squeeze head moves to and from squeezing position with ease. Simple rugged construction assures successful production.

Type 20-42D Heavy Duty Jolt-Squeezer with Pneumatic Pattern Draw, Roll-Off Device ▶

Smooth, sensitive operation, dependable performance. Permanent alignment, forced lubrication, heavily ribbed sections for added strength. Guide pins and bushings steel hardened and ground.



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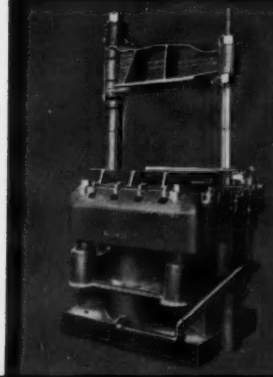
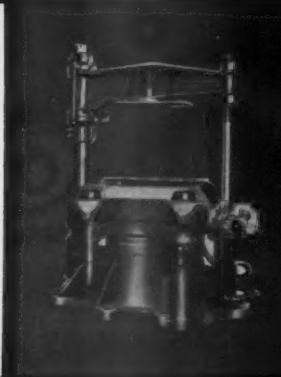


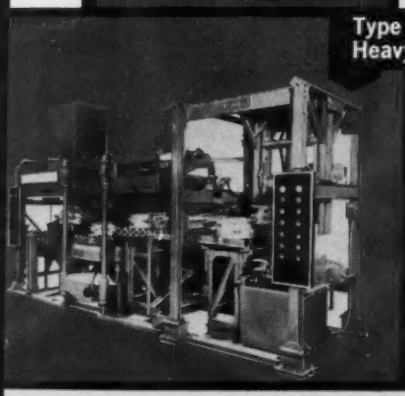
◀ **Type 33-54D Heavy Duty Jolt-Squeezer with Pneumatic Pattern Draw**

Rugged heavy duty machine that produces accurate, uniform molds, true to pattern. Simple controls, push button or manual operation. Low upkeep and long life. Automatic Jolt & Squeeze timing.



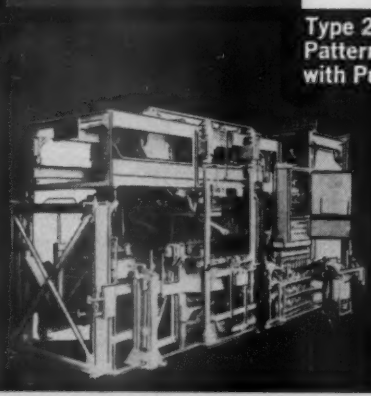
◀ **Type 18-44K Heavy Duty Jolt-Squeezer with Pneumatic Pattern Draw**

Support base, brackets, cylinder and upright bearings cast in one piece for greater rigidity, permanent alignment, equalized squeeze. Dirtproof housing. These types available in nine sizes with Squeeze Piston diameters from 11 to 36 inches.



Type 21C Airomatic Automatic Heavy Duty Drag Molding Unit

Makes, closes, removes and returns molds continuously and automatically. Simple push button air-to-air controls, no limit switches, no electrical timers, no electric pressure switches, no electrical latch relays to get out of order. Pneumatic pattern draw, mold turnover and transfer, sand spill upset and all the other special Nicholls features.



Type 24C Jolt, Squeeze and Pattern Draw Molding Machine with Push Button Control

Equipped with an air-operated car type squeeze head, built-in flask roll-in roll-out device, measuring sand hopper, flask indexing device and sand spill upset, flask feed-in elevator. Completed mold is automatically turned over and transferred to conveyor.

NICHOLLS

Circle 728 on Page 51

Behind the hand of American industry for half a century

law recognizes permits an employer to practice and use without compensation an invention developed by an employee. It is, in fact, a nonexclusive license to use, manufacture, and sell the invention without financial obligation to the inventor.

"A 'shop right' arises where an employee, even though not hired by his employer for the particular work of inventing, conceives and perfects an invention during his hours of employment and working with his employer's materials and appliances and at his employer's expense."

Ground for this conclusion by which the employer acquires this right, here outlined by the court, is that the law considers that as the employee has used the time, materials, and facilities of the employer to gain this result, it is but equitable the employer should be permitted to use what is the fruit of his own property.

Can Secure Protection—Only a few months before the decision of this case, however, the Supreme Court of that state had said of agreements such as the one in this controversy, made between the employee inventor and his employer, that such an employee not under contract with his employer to invent, may protect himself against the establishment of rights of this character, when the employer, by words, acts or conduct clearly negatives the establishment of such a right.

On this statement of the law as authority, the court in its conclusion of this recent case involving the electrotyping molds, awarding judgment to the employee for the unpaid royalties, said,

"It is not only with regard to inventions which are perfected by an employee on his own time and at his own expense that a shop right may be defeated, but it is likewise true that if the employer and the employee by contract or by other clear-cut expression of intentions enter into arrangements whereby the employer agrees to compensate the employee for any invention he may develop, either working on his own time or on the employer's time, then such arrangement is effective and determines the relationship of the parties with regard to the invention.

"In other words, parties may contract as they wish and it is entirely within the rights of an employer to contract away a 'shop right' which would arise under equitable principles if no agreement were made. An express agreement supersedes an implied right which would come into existence if the parties remained silent."

References

Deye v. Quality Engraving & Electrotype Co., 100 N.E.2d 310, Ohio, July 20, 1950
Gemco Engineering & Mfg. Co. v. Henderson, 84 N.E.2d 596, Ohio, March 2, 1949

ASTM Schedules Symposia for June Meeting in Boston

Nearly 90 papers will be presented at 11 symposia scheduled for the 61st annual meeting of the American Society for Testing Materials to be held at the Statler Hilton and Sheraton-Plaza hotels, Boston, during the week of June 22.

The symposia will be held in conjunction with the numerous technical sessions and committee meetings arranged for the week. They include discussions on Fundamentals of Fatigue, Solvent Extraction in the Analysis of Metals, Radiation Effect on Materials, Radioactivity in Industrial Water and Industrial Waste Water, Materials Research Frontiers, Bulk Sampling, Durability in Structures, Particle Size Measurement, Paper, Soil Testing, and Effect of Water on Bituminous Mixtures.

Technical sessions will deal with fatigue, high temperature, ferrous and nonferrous materials, cement, concrete, textiles, soils, etc. The annual Edgar Marburg Lecture will be presented by Elmer W. Pehrson, chief, Division of Foreign Activities, U. S. Bureau of Mines, and will discuss nonmetallic resources. The H. W. Gillett Memorial Lecture will by given by Clyde Williams, Clyde Williams & Co. His subject will be high-temperature metals in the jet age—their requirements, properties, and supply.

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FACINGS	**"MOLDUKO"** (Trade Mark Reg.) **CORE & MOLD PROCESS** Produces smooth castings. Stops "burning in". Air-dries.
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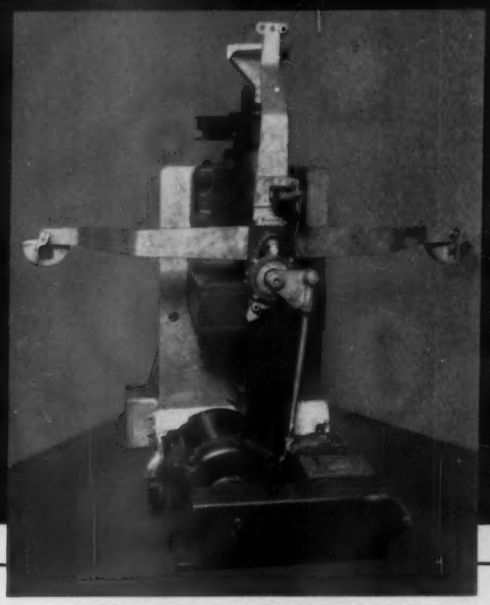

Here at Cleveland, we feel that a buyer of metallic abrasives should be able to do just that.

The breakdown tester we use is shown herewith, and it's designed to separate the fact from the fiction.

After 100 passes through this tester, at 7200 r.p.m., we *know* how good our abrasives are and how long they will last.

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COMPARATIVE TEST REPORT

MATERIAL TESTED — S660 CHILLED IRON SHOT

A – Cleveland Metal Abrasive B – Competitors C – Competitors

SCREEN ANALYSIS

U.S. No.	S.A.E. Spec.	A	B	C
8	0	0	0	0
10		35.5	54.0	36.0
12	85	60.3	36.2	48.0
14	12	4.2	7.7	14.0
Pan	3	0	1.1	2.0

CHEMICAL ANALYSIS

	A	B	C
T.C.	2.72	3.29	2.42
Si	1.13	1.36	1.20
Ph	.056	.380	.130
Mn	.40	.36	.47
S	128	.176	.141

Rc HARDNESS

	A	B	C
Low	58	59	57
High	62	65	62
Average	60	63	59

BREAKDOWN TEST

Thru U.S. No. 10 on U.S. No. 12 — No. of Grams Tested—100 — 100 Passes at 7200 R.P.M.

	A	B	C
12	0	0	0
14	.2	0	.1
16	.4	0	.5
18	4.8	.1	3.5
20	15.6	.2	9.4
25	24.4	7.9	20.7
30	13.5	8.4	12.1
35	9.9	10.6	11.5
40	4.1	11.3	6.0
45	2.7	7.1	4.6
50	2.0	14.2	3.4
Pan	13.7	27.6	17.8
Loss	8.7	12.6	10.4

Remarks — C.M.A. material best by test. B. M.

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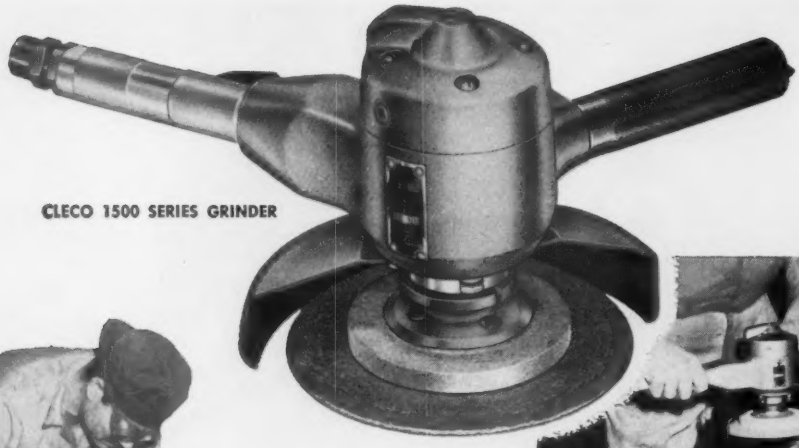

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CLECO 2000 SERIES GRINDER

The many grinding, sanding and wire-brushing operations best accomplished by vertical grinders are performed in superior fashion by this pair of CLECO Vertical Air Grinders. You'll draw extra dividends of performance, economy and safety to personnel with the outstanding CLECO Vertical Grinder team.

The Cleco 1500 Series Grinder packs great power for its size . . . does 6" cup wheel grinding at 4500 and 6000 RPM. Ideal for general abrasive and cleaning operations . . . particularly prized as edge grinder (7" cut-off wheel capacity). An easy-handling, versatile tool for any metalworking plant. Height 6$\frac{13}{16}$", weight 7$\frac{3}{8}$ lbs.

For those extra-heavy-duty jobs, the Cleco 2000 Series Grinder is your tool. Designed with an unusually large rotor, this tool delivers terrific power at 4500 and 6000 RPM with a 6" cup wheel or 9" cut-off type wheel. A real heavyweight in work capacity, but not in size. Height 7$\frac{5}{8}$", weight 11$\frac{3}{4}$ lbs.

A variety of wheel guards is always optional, including Cleco's super-safe integral revolving type and the straight cutaway (not illustrated).

You'll like these tools' fast cutting action . . . the high quality finish they put on your product. Your tool operators will appreciate their fine balance and "feel" . . . their low level of noise and vibration.

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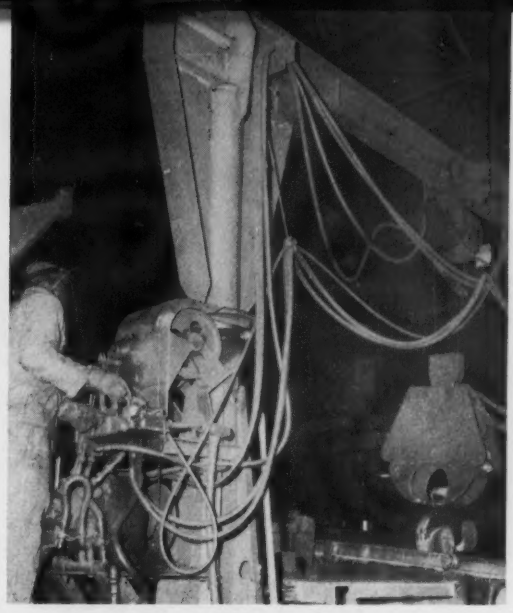
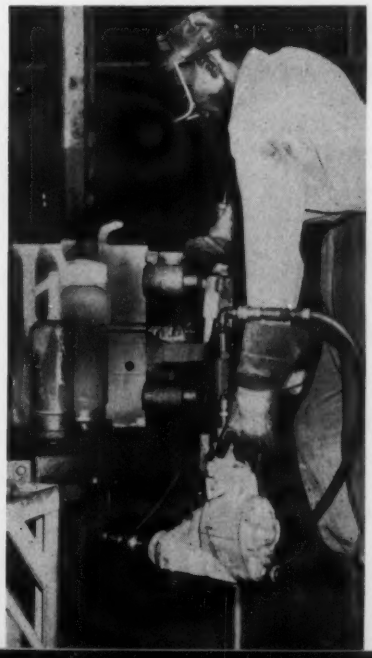


Air hoist serving shakeout machine releases crane for other overhead work and increases operator safety

Small air grinder with a cone wheel is employed to finish impeller inlet

Air motor provides power to raise and lower collapsible core in book mold. It increased production rate on the job and reduced labor costs



Cutting Foundry Costs with

AIR TOOLS and HOISTS

By A. C. RINGER
Ingersoll-Rand Co.
New York

ALTHOUGH foundries are becoming more and more mechanized, management is finding that a spiraling trend is pushing production costs to a level which puts a heavy squeeze on profits. It has become imperative to re-evaluate every operation to insure that it is handled as efficiently as possible.

One way to reduce production costs is to mechanize the worker as well as the plant. Portable air-operated tools, for example, are cutting operating costs and conserving human energy while raising man-hour output in a variety of foundry operations. These tools are being used increasingly in molding and cleaning departments as well as for maintenance work. They provide best production results and lowest operating costs when they are chosen carefully for the work they must do.

Grinders—There are two types of grinders—horizontal and vertical. Each has its own uses. Horizontal grinders use straight wheels, varying from small mandrel-mounted points about 1 inch in diam to large, 8 in. wheels with a 2 in. face. Horizontal grinders are used primarily to grind irregular or curved surfaces. The 8 in. wheel requires the largest and most powerful grinder. For a 6 in. wheel, a slightly lighter grinder with less power but more speed may be chosen. The 8 in., organic-bonded, hard wheels cannot be run safely beyond 4500 rpm, nor should 6 in., organic-bonded, hard wheels be run beyond 6000 rpm. In all cases, the governed speed of the grinder should correspond to the rated rpm of the wheel to be used.

Horizontal grinders of medium weight frequently are used with cone-shaped wheels of $2\frac{1}{2}$ in. diam for working into filleted corners. Grinders of this size run with a free speed of 9000 or 12,000 rpm.

Vertical grinders are made in sizes ranging in speed from 3000 to 6000 rpm and weighing from about $9\frac{3}{8}$ to $12\frac{1}{2}$ lb. The small grinders take a 5 in., cup-type, organic-bonded, hard wheel which is governed up to a free speed of 6000 rpm. The larger sizes run a 6 in., cup-type, organic-bonded, hard wheel at a free speed of 4500 rpm.

The vertical grinder, with its oversized wheel area, is useful for working on large flat surfaces. For this reason vertical grinders are used to smooth gate and riser stubs, remove fins, and smooth down welds on large, flat areas. Vertical grinders also are used with flexible sanding pads and abrasive discs for surface dressing of castings requiring high surface finish, such as machine tool castings.

Recently, Ingersoll-Rand developed a new line of vertical and horizontal grinders with a safety shut-off which automatically prevents overspeeding of the grinder. This built-in unit operates in case of failure of the regular governor should motor speed exceed safe wheel speed. If this failure happens, the shut-off automatically stops the wheel, making it impossible to operate the grinder until the cause of overspeeding has been corrected. These grinders also provide maximum cutting speed and minimum air consumption, regardless of load.

Both vertical and horizontal-type grinders are used to remove gates and risers on medium-sized castings too large to be carried to table-type

for better castings
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HI-QUALITY
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Circle 803 on Page 51

cutoff wheels or bandsaws. For this job, a semiflexible, high-speed abrasive cutoff wheel is used to nick gates and risers prior to breakoff. When the locations of gates and risers permit this type of operation, considerable handling time is saved.

Versatility of Grinders—The air grinder has great versatility within the limits of proper wheel size and safe running speed. An Ohio foundry even has mounted an air grinder backward to solve a difficult polishing problem and increase production. It could not use a conventional grinder in the cleaning room to polish the spiral, concave surfaces of pump casings to a high degree of smoothness because the deep, narrow cavities would not admit the conventional tool. An air grinder was mounted in a frame, and a pulley was attached to the arbor. A belt ran from the pulley to another one at the front end of the frame, and a grinding disc was attached to the front pulley. This arrangement allows the operator to grind and polish the involutes easily and gives a fine finish to the work.

Chipping Hammers—The trend toward higher strength iron and steel castings and expanded use of new alloy and light metal castings has caused modifications even in the tooling required for chipping. New materials make new demands, and a whole new line of chipping hammers with controlled power for special cutting conditions has been developed.

Chippers require chisels to knock out cores and to remove fins, gates, and risers. The size of hammer and type of chisel must co-ordinate for best efficiency. These new developments in chipping hammer design make it possible to fit the hammer exactly to the work and to the operator by changing only one small part in many cases.

Most iron and steel foundries use a Size 2 chipping hammer for general use or a Size 3 for gates and risers. In malleable and nonferrous foundries, a Size 1 hammer will handle most work. Size relates to the length of the piston stroke in inches; a Size 1 hammer has a 1 in. piston stroke, for example.

The same hammers used in chipping can be used for core removal on small and medium castings, but heavy castings usually require a heavier hammer like a pneumatic core breaker, which is designed especially for this work.

Chisels—Selection of chisels is as important as that of hammers. Using chisels worn almost to a nubbin is false economy. It results in

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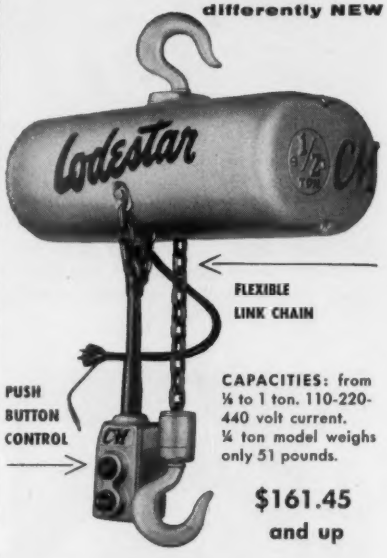

CAPACITIES: from ¼ to 1 ton. 110-220-440 volt current. ¼ ton model weighs only 51 pounds.

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Circle 804 on Page 51

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FOR BIG SAVINGS IN 270 FOUNDRIES

KOLD-SETTING Binder will produce optimum results when the installation is engineered by a qualified specialist. That is why we maintain "in-plant" service.

There are now 270 foundries using KOLD-SET to produce better castings at lower costs. The average reported savings is in excess of 40%. Each of these foundries was "started up" with the aid of one of our KOLD-SET engineers. Equipment was studied and evaluated—then, recommendations were made on how KOLD-SET could be adapted to produce best results. The KOLD-SET man stayed with the installation during the early stages and remains on call if further services are required. Periodic service calls further assure our customers of maintaining production.

If you are wondering how KOLD-SETTING Binder will work—a KOLD-SET man will be glad to study your processing and offer recommendations without obligation.

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improve foundry profits

To expand the market for castings, foundrymen gain by impressing their customers with the importance of better designs and realistic specifications. If this is done at the outset, your own profit and your customer's continuing satisfaction are assured.

Establish practical design standards

Determine, if possible, the true service requirements and practical characteristics your customer needs. Mutually establish a standard which satisfies the need at a reasonable cost. A good design must be satisfactory functionally, structurally and foundry-wise.

Good design insures trouble-free foundry practice, profitable operation and customer satisfaction. Castings with even stress flow are more serviceable and are easier to pour. Experimental stress analysis with M Stresscoat brittle coatings lets you make design changes without guesswork or wasted effort. Design for service, easy casting and high profits.

Keep your finger on the pulse of production

M Magnaglo (M Zyglo for non-ferrous) is recommended as a "finger on the pulse" means of determining the causes of any cracking in the foundry. Simple tests immediately after shakeout or cleaning can locate cracks when they first occur. This permits you to take corrective action, no matter what the cause. With sampling inspection you actually control the quality of the entire run as it is being poured. You do not waste time and profits in handling, heat treating, finishing, or machining, intermittent lots of cracked castings. It all adds up to better products for the customers and higher profits for the foundry!

Write for details on how Magnaflux nondestructive testing methods can be employed to increase the yield of usable castings and foundry profits. No obligation, of course!

Lightweight Magnetic Particle

Y-5 YOKE KIT

Provides Portable Inspection

Uniform quality castings are far more important to foundry profits and customers than perfection. For this reason, many gray iron foundries have adopted the Y-5 Yoke Kit for magnetic particle inspection at stages of "in-process" operations. The Y-5 is easy-to-use, fast, light-weight, portable and *low cost!* It reliably detects handling cracks, hot tears and similar defects open to the surface. The Y-5 is a convenient and inexpensive means of checking pilot runs for cracks, or for inspecting local areas of castings after cleaning, machining, etc.

COMPLETE KIT ONLY **$195.00**

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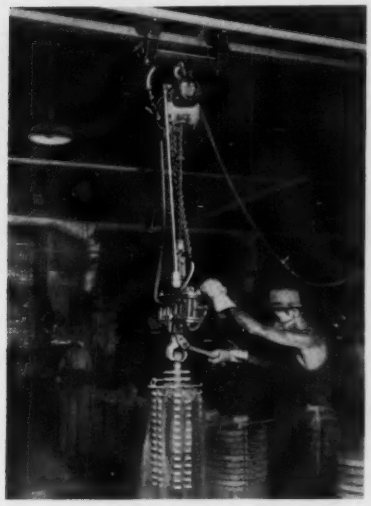
Circle 733 on Page 51

shortened cylinder bore and piston life, and the excessive vibration tires the operator. Standard chisel shapes and shank dimensions take care of most work, but modifications can be made to suit the requirements of any job.

In one plant, the workers disliked an operation which involved using a hand hammer and chisel over an 8-hr day. A small, lightweight air hammer with chisel cut down operator fatigue and increased the speed of the operation by 30 per cent. This air tool paid for itself in 16 days.

Sand Rammers—Through years of service, sand rammers have proved that castings made in power-



Air hoist does fine job serving piston ring foundry shakeout vibrator

rammed molds are superior in quality and uniformity to those castings made in hand-rammed molds. In addition, these rammers save wear and fatigue on the operator and increase production. The *Compressed Air Handbook,* published by the Compressed Air and Gas Institute, reports, "On bench molds, the use of a pneumatic sand rammer in place of hand methods reduces overall time per (a given) mold from 13 to 9 minutes."

Sand rammers are of two main types—the bench rammer for light mold and core work and the floor rammer for heavy flask ramming and built-up molds. Most popular sizes for bench work have a 2 to 4-in. piston stroke and range from 10¾ to 12 or 15 lb in weight. Floor rammers have a piston stroke of 4 to 6 in. and weigh from 15 to 22 lb for ordinary floor work. Ram-

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LOGAN'S FAMOUS
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Often a problem that we regard as "strictly our own" has already been solved by others under similar conditions. Sometimes it's even common. That's why it pays to know what others are doing.

Perhaps the new Logan Key Book will help you iron out materials handling wrinkles adding unnecessary time and labor to production costs. Logan is happy to share its experience with you in the form of this generously illustrated booklet of authentic case histories—24 in all with 50 actual installation views.

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Circle 734 on Page 51

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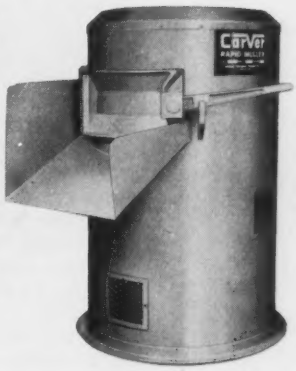
Specially designed and patented mixing arm turns out a full batch every 75 seconds . . . without generating excessive friction heat. You *save up to 30%* in binder! No wheels or paddles to interfere with cleaning. Takes up as little as 7 sq. ft. of floor space. Fast — efficient — compact! Batch sizes up to 1200 lbs.



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Provide complete de-aeriation of core box *without clogging*. Quickly and easily installed in either wood or metal boxes. Precision manufactured of solid bronze to leave no mark on core. Knurled on side to grip wood boxes better. Comes in sizes to meet the specific job requirements.

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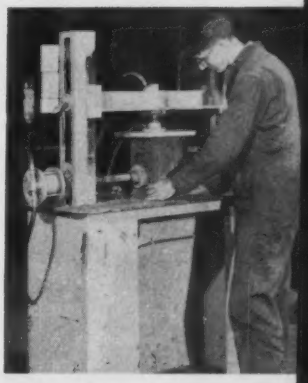
The *best* binder at the *lowest price* — BY FAR! And you get the best shakeout, with scrap held to the absolute minimum. Faster chemical reaction to CO_2 saves time and gas. Insist upon STEINEX —the original CO_2 binder available only from Carver! WHY PAY MORE??

CARVER AUTOMATIC GASSING APPARATUS

Fully automatic! Hardens cores completely through in a few seconds and at a fantastic savings in CO_2 gas! Easily adjusted to core boxes of almost every shape and size. Pneumatic operation requires little air to operate. Savings in initial cost and operating expense is far less than that of drying ovens for oil cores.



. . . and you get CARVER service — a BIG PLUS VALUE!

Carver has the experience and in-the-foundry know-how that will show you and help you get the *most* from your CO_2 equipment and the CO_2 process!

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Circle 735 on Page 51

mers for extra-heavy work are as heavy as 31 lb.

Sand rammers are made with a plain-head or a lubricator-head block and with a choice of lever throttle or grip handle. They may have rubber-tipped butts, rubber-tipped peens, or rubber topping-off butts. Selection of a suitable rammer and rammer head depends on whether the job is floor or bench work and also on operator preference.

A new type of sand rammer with improved front-end design has a double-action seal to prevent the entrance of any sand or dirt into the bore of the guide or the ductile iron barrel. It is called a "sand wiper rammer" because of its self-cleaning feature. The front seal is of neoprene felt which wipes the surface of the piston rod clean. Behind this seal is an air seal, a leather ring encircling the piston rod. Air pressure against the face of the seal holds it tightly against the rod and provides positive sealing with a minimum of friction. The complete packing unit is self-adjusting to compensate for wear and keep power and speed at maximum level.

For light work, Size 130 has a 1-in. barrel bore and a 2½-in. piston stroke. Sizes 140 and 150 each have a 1⅛-in. barrel bore and a 4 1/16-in. piston stroke. The weight with butt runs from 10⅜ lb for the smaller size 130 to 12¾ lb for the intermediate size 140 and 15½ lb for the larger size 150.

Special pipe rammers for pipe and ingot mold ramming are built with a soft end which can be machined to fit any extension rod.

In foundry practice, portable air drills, screwdrivers, and impact tools are used mainly for patternmaking and maintenance of equipment. They are available in a range of sizes to handle fasteners of almost any size.

Latest developments in the family of portable air impact tools are all-purpose tools which, with appropriate accessories, can be used to ream, drill, run and remove fasteners, tap, drive screws, and do hole saw work or wire brushing.

Examples of cost savings on the use of portable air tools are legion. They enable an operator to cut approximately 90 per cent off the time required for such operations as drilling holes in metal, concrete, or wood and removing and applying nuts, bolts, studs, and screws. They thus reduce machinery downtime significantly.

One air-powered impact tool made possible savings of 21 to 1 in cleaning fins, sand, and scale from ½, ⅝, and ¾-in. holes in bearing plate castings. Previously the castings had to be carted to drill presses to be reamed. With the air tool and appropriate reamers, holes were reamed on the floor, eliminating fixtures and all extra handling. The

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When a new wheel is used, sharp abrasive grains are worn dull . . . wheel pores tend to fill with metal . . . grinding efficiency goes down. But you can keep all grinding wheels at top efficiency by dressing them regularly with inexpensive Desmond mechanical dressers.

Desmond Heavy Duty dressers are designed specifically for use on high speed, coarse snagging wheels, where a fast grinding surface is desired. They are the most effective dressers on resinoid and rubber bonded wheels.

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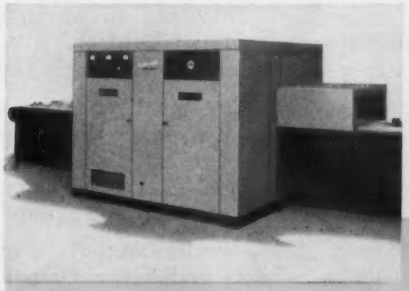
"Nah, didn't catch any fish. But wait'll you see what I found for my hobby foundry!"

FAST

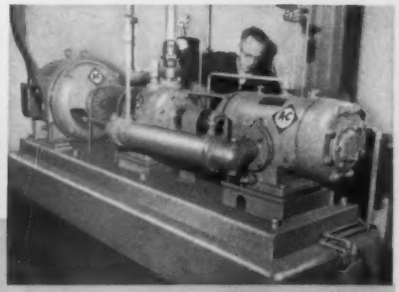
because the rated capacity of the *Foundromatic* Shakeout is over twice its weight

The extra reserve weight of Allis-Chalmers shakeouts assures fast core knockout or flask shakeout. Husky two-bearing, circle-throw construction means steady operation for years. Free-floating shakeout body is one-piece unit and the entire structure is stress-relieved after welding. Simple two-bearing mechanism ignores overloads. Oversized bearings last much longer.

Smooth stopping — Allis-Chalmers patented automatic control eliminates stopping bounce. It brings shakeout to a smooth stop by reversing current after motor has coasted to one-third speed. For all the details ask your A-C representative for Bulletins 07B6365B and 07B8141, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.



***Foundromatic* Dielectric Sand Core Oven.** There are 14 important advantages in using this fast, modern method of core baking — and each will save you money. Find out what they are. Bulletin 15B7306D gives the complete story.



***Ro-Flo* Compressors for Foundry Air.** Sliding-vane design eliminates major causes of compressor trouble, maintains constant efficiency. Compact rotary units eliminate need for heavy foundations. Bulletins 16B8244 (two-stage) and 16B8126 (single-stage).

Foundromatic and *Ro-Flo* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-5740

tool paid for itself in eight days.

Hoists—Where loads of 1000 lb or less require lifting, powerful, compact, hoists are used. Typical uses include the small castings cleaning department, where castings must be lifted onto or from conveyor belts or trundle trucks at established points. They also are widely used on shakeouts and in acid-bath cleaning rooms for dipping castings into the bath.

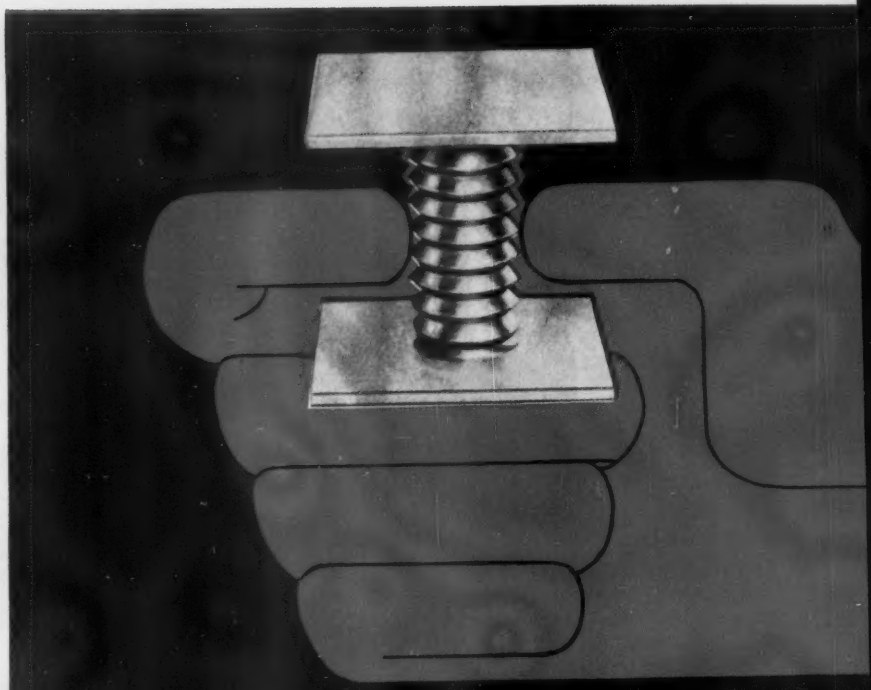
The wide application of air hoists in foundry practice mainly concerns larger units. In an Oklahoma foundry, savings were effected when the hoist was mounted on the I-beam of a boom crane to service the shakeout and thus release the overhead crane system for other work. A trolley driven by an air motor moves the hoist along the beam by remote control, and pneumatic tongs, actuated by double-acting air cylinders, also are operated by remote control. Another air hoist, hitched to a pulley system, turns the boom.

A malleable iron foundry installed three air hoists to handle furnace charging. By use of these hoists, the foundry now has graduated speed control, protected brakes, and remote control operation at a very economical cost. The air hoist equipment eliminated expensive downtime and paid for itself within three months.

Air Motors—Although nonportable in operation, air motor installations have been used to operate hand equipment on molds, at a saving of time, cost, and operator fatigue. Specifically, a light metal plant had a job which required moving a 4-ft handle through a 200-degree arc to raise and lower a collapsible core in a permanent mold. The handle was attached to a rack and pinion. Since it was necessary for the operator to bend down to operate the lever, the job was extremely tiring.

When the handle was removed and an air motor installed to operate the pinion, production was increased 23 per cent, from 180 to 220 pieces a day. The company installed two more machines equipped with air motors, with equivalent production increases. In addition, $3.10 in labor cost is saved daily on each machine.

Air Pressure at the Tool—To effect greatest savings and get maximum production from air tools, hoses and fittings should be checked for proper fit and main air lines and downpipes checked for proper size. The tool can develop full power only if there is a sufficient



MILWAUKEE CHAPLETS *have "top preference"* in the production of

THERE ARE many good reasons why Milwaukee Chaplets and Chills can do an outstanding job in producing sound, uniform castings. A brief inquiry on your part will bring complete details.

May we stress the fact that we are manufacturers with complete facilities to produce our own products. As such, we can guarantee strict adherence to your specifications, quality control of all material used, rigid inspection at every step of production and prompt service.

If you have a straight run-of-the-mill job or one that presents unusual problems, why not send us your blue prints. We will have the answer for you.

Milwaukee

and

1025 SOUTH 40th ST.,

established

sound uniform castings

38 YEARS *of service to the Foundry Industry*

● This year marks our 38th Anniversary. Our history is a record of achievement in the building of close tolerance machinery; in research and development to constantly improve our products and in engineering service to solve your problems no matter how cumbersome they appear.

Today, we have every facility to serve you quickly and efficiently with the very finest chaplets and chills on the market.

CHAPLET

MANUFACTURING COMPANY

MILWAUKEE 46, WISCONSIN

amount of pressure at the tool itself. The air pressure reading at the compressor does not indicate the pressure at which the tool is operating.

A pressure drop from 90 to 70 psi results in a performance loss of 20 per cent in an ordinary grinder. Pressure drops may occur because of undersized pipelines and air hose or improperly installed valves and fittings. Length of the air hose also affects air pressure. The hose should be as large as possible so that air pressure is not restricted. Sometimes pipelines are slightly larger than the minimum size required in order to prevent air restriction caused by accumulated dirt on inside walls through the years.

An examination of air pressures at a pump manufacturing plant showed that two-thirds of the plant was being served by a ½-in. air line. It was found that the pressure at the tools was only 68 to 72 psi and that the power output of the tools could be increased 37 per cent by raising the pressure at the tools to 90 psi. The revelation that the major part of the plant had inadequate piping facilities came as a surprise to the superintendent, even though he had been in charge for a number of years. As a result, he made suitable recommendations with a view to correcting the low pressure condition.

Air tools will take more abuse and neglect than any other type of hand-held power tools. An air motor needs no ventilation and gives excellent service in foundry atmospheres. They are precision-built machines, however, and will give longer service and better results when properly selected and cared for. Periodic servicing and inspection and proper lubrication will more than pay for itself.

Chance Vought Contracts for Steel Castings Research

Chance Vought Aircraft Inc., Dallas, has contracted with three foundries to conduct research on three methods of casting high-strength steel parts for supersonic aircraft.

Contracts for about $250,000 each were awarded to Stanley Foundries Inc., Huntington Park, Calif.; Mercast Mfg. Corp., La Verne, Calif.; and Pacific Alloys Engineering Corp., El Cajon, Calif. Each company will work on a casting of different configuration.

Chance Vought holds an Air Force contract for the project.

Circle 738 on Page 51

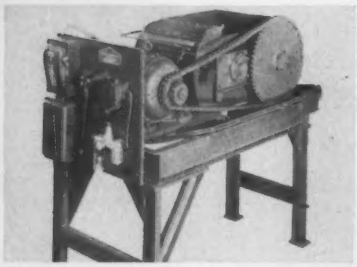
MORE PEOPLE WILL VISIT THIS YEAR'S

MORE PEOPLE

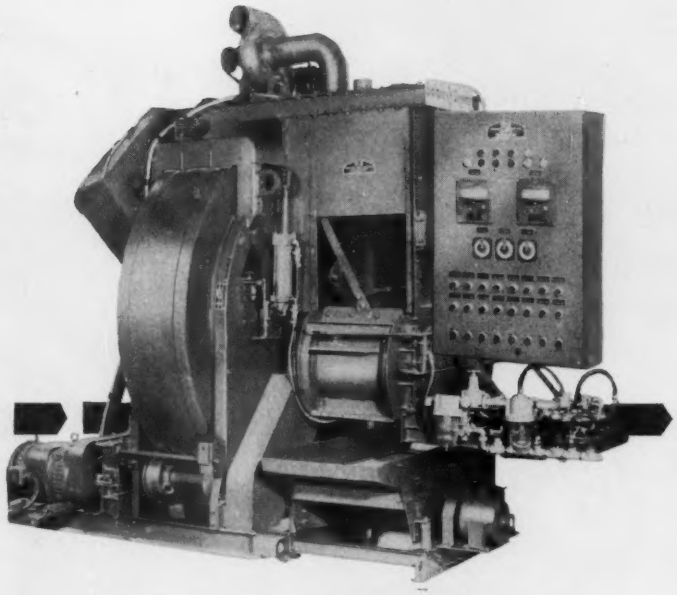
C&S AUTOMATIC

See C&S coated sand being made at our booth daily. Be sure to stop by and fill out a card. We will ship a generous free supply to the destination of your choice.

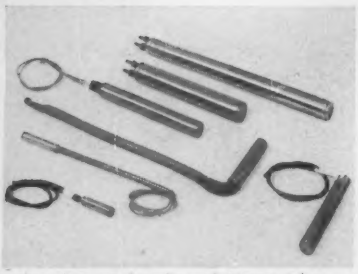
FROM BEGINNING TO END, THEY WILL SEE WHY C&S DELIVERS HIGHEST QUALITY THROUGH CONSTANT CONTROL.



See the new "PUGALL" pugmill mixer. Highly adaptable. Mixes everything from resins and oils to CO_2 mixes—quickly and uniformly. Also ideal for preconditioning molding sands.



SEE THE ALL-NEW "MIXALL" IN ACTION! Sand is charged into the heater drum—then charged into the pugmill, where resin and "hexa" are added automatically and homogeneously mixed. Result: 300 pounds of free-flowing, lump-free, high-quality coated sand every 5 minutes. Up to 3,000 pounds an hour!



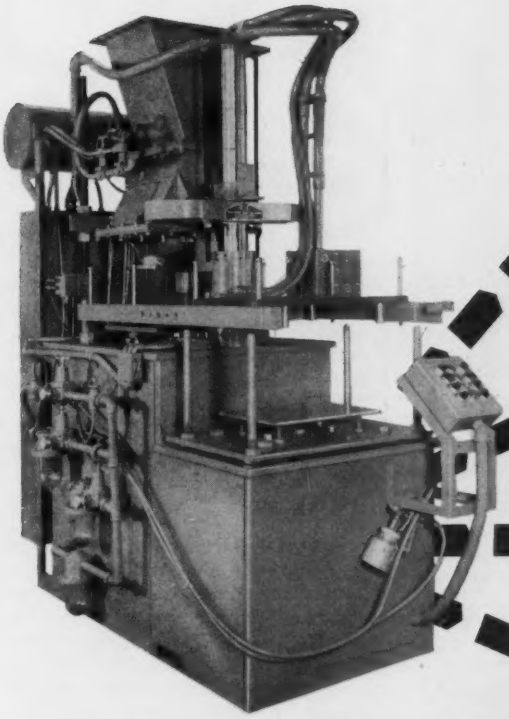
See the complete line of C&S stainless steel cartridge heating elements. Unsurpassed for dependable, economical control of electrical heat.

COMING TO CLEVELAND? You'll find the complete line of C&S equipment in booths 1838 and 1937 at The AFS Foundry Show.

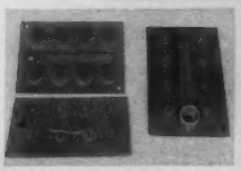
For more information on the C&S products shown here, write to:
C&S Products Co., Inc.
18656 Fitzpatrick Ave.
Detroit 28, Michigan

AFS FOUNDRY SHOW THAN EVER . . . and

WILL SEE MORE FOUNDRY EQUIPMENT

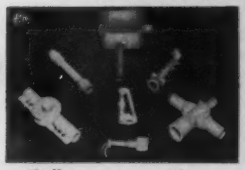


Shell molds completely cured every 30 seconds — ready for removal.



See shell molds and shell cores made simultaneously by The "BLO-CORE."

The "BLO-CORE" makes vertically-split cores, horizontally-parted cores and 4-part draw cores.



Shell cores every 30 seconds! Up to sizes 18"x 24"x30" high. Learn how at the C&S booth.

SEE THE "BLO-CORE" AT WORK! Don't miss the first public showing of shell cores and shell molds being made simultaneously. The "BLO-CORE" produces a complete shell with shell cores every 60 seconds . . ready for pouring.

C&S PRODUCTS COMPANY, INC.

Engineers and Builders of Automatic Foundry Equipment

18656 FITZPATRICK AVE. • DETROIT 28, MICHIGAN, U.S.A.

AFFILIATED WITH Barber-Greene

A NEW LIGHT-DUTY TROLLEY CONVEYER . . . ENGINEERED AND STANDARDIZED BY

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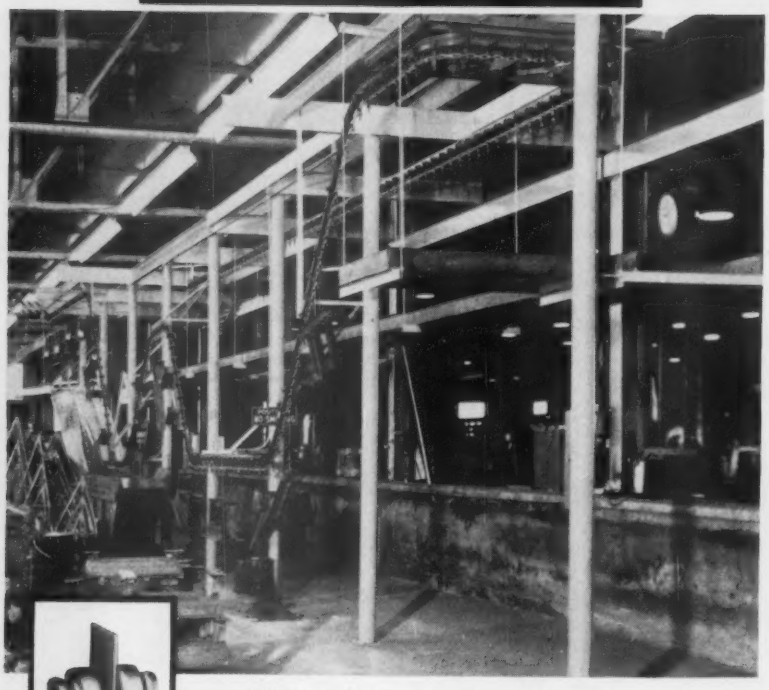

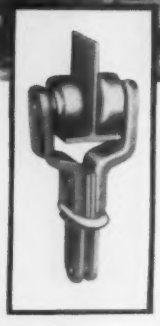

A #232 Trolley Conveyer Applied for painting, drying and storage of miscellaneous parts.

This light-duty Trolley Conveyer has several features which make it a leader in the field of overhead conveying. It is comparatively easy to install, with hanger-rod and angle hanger supports available to meet any supporting requirements. Standard turns, vertical bends, and takeup assemblies are made in sizes and types to fit even the most difficult layout.

The drive units have a wide range of capacities and horsepowers, with conveyer speeds ranging from one to fifty feet per minute.

The #232 wheel was specifically designed for trolley conveyer service and is an outstanding performer. This equipment is priced reasonably and is available from stock, being assembled from standard parts throughout.

Write for Bulletin T-58 today.

MATHEWS CONVEYER COMPANY

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CANADIAN DIVISION . MATHEWS CONVEYER COMPANY, LTD., PORT HOPE, ONTARIO.

MATHEWS

(Member Foundry Equipment Manufacturers Association)

Meditations of a Sandman

By HAROLD E. HENDERSON
H. C. Macaulay Foundry Co.
Berkeley, Calif.

"Challenge"

IN THE foundry—both jobbing and specialty—we are reminded repeatedly of the desire and the need for castings with close conformity to patterns, and more attractive surfaces. The desire is, or should be, due to our pride of performance. The need springs from customer requirements.

We may be lacking in pride, content with a below-average product, trusting that the indiscriminate customer will continue to accept and reorder. But we cannot overlook the fact that customers generally are becoming more and more discriminating—hence the advent of the shell process, CO_2, and others which more nearly approach so-called precision. Even the makers of sash-weights and manhole covers have been forced to improve their products greatly during the last quarter-century.

Excuses—The foundryman who has been neither lured nor goaded into improving his product has many excuses for not doing so. He may tell you that his customers are satisfied with current merchandise—a statement that might be disputed by some of those same customers.

He will defend his sand practice by insisting that it would be a waste of money to buy a more expensive fine sand for molding when it quickly would become contaminated with the cheap, coarser material which he considers essential in his cores. He has a point here that is not without merit, one that is difficult to refute.

When care is exercised in the removal of castings at the shakeout, however, most of this coarser material can be kept out of the system, and the remainder need not be greatly detrimental. Of especial im-

Put a superfine finish on YOUR castings

with Supersil Silica Flour

In your mold wash. Supersil always gives the same even coating and thickness of application. Its high fusion point and excellent refractoriness help you to reduce metal penetration, minimize surface defects and produce castings with super-smooth finish.

Added to your molding sand, Supersil increases dry and hot strengths as well as sand toughness. Your sand mixture is more workable and will hold dimension better. Moreover, the ability of the mold to maintain its shape at pouring temperatures is increased with Supersil. The exceptionally high fusion point of Supersil increases the overall sintering point and fusion point of the sand mixture.

Unequalled quality (99.9% SiO_2) and perfect uniformity, shipment after shipment, make Supersil the best Silica Flour for you. To obtain further information and free working samples, contact **Pennsylvania Pulverizing Company, Two Gateway Center, Pittsburgh, Pa.**

P.G.S. Pennsylvania Glass Sand

P.P.C. Pennsylvania Pulverizing

The Nation's Leading Producers of Pure Crystalline Silica

NEWPORT, N.J. • MAPLETON, PA. • McVEYTOWN, PA. • BERKELEY SPRINGS, W.VA. • JACKSON, O. • PACIFIC, MO. • KLONDIKE, MO. • MILL CREEK, OKLA.

Even with KIRK & BLUM Dust Control, you'd hardly expect to lunch off the floor in a busy foundry . . . but there is a vast difference between a "clean" and a "dirty" foundry. And not just in appearance! The "clean" foundry, with effective dust control, profits in reduced maintenance, in higher employee morale, in better plant-community relations and in overall efficiency. Cleanliness is vital to successful operation.

Because foundry dust control is "no picnic," put your problem up to experts. KIRK & BLUM, with more than 50 years of experience, does the complete job . . . design, fabrication and installation of efficient, dependable dust control.

FOR CLEAN AIR . . . THE INVISIBLE TOOL

KIRK & BLUM

DUST AND FUME CONTROL

For information and literature, write The Kirk & Blum Manufacturing Company 3108 Forrer Street, Cincinnati 9, Ohio.

portance is a good screening arrangement and a magnetic separator. These will remove the most objectionable elements. Admitting that his muller or aerator is obsolete or otherwise inadequate, he still will insist that he cannot afford the cost of suitable replacements.

No one logically can blame a man for not buying something that he can't afford, but let's take a closer look at the economy of his operation. If his muller is as inefficient and ineffective as some I've seen, he may be wasting 25 per cent or more of his bentonite, in addition to preparing a poorly mulled sand which in turn can be responsible for a variety of casting defects. Rough or swollen castings can become very expensive in the cleaning room, and the replacement of defectives represents more money down the drain.

Paying Double—Foundry bookkeeping frequently proves deceptive, but if records of complete honesty were kept, covering all phases of loss, I'm sure that our friend would find that he is paying doubly for machinery that he needs but doesn't have—the machinery that he insists he can't afford.

On the other hand, perhaps one of the saddest object lessons known to foundrymen is that of overmechanization—the installation of expensive machines which may prove entirely unsuited to the work at hand. These still can be found gathering dust and occupying valuable room in shops for which they were never intended. It probably is the fear of making such costly mistakes that causes many foundrymen to shy clear of purchasing a new machine.

In countries where "catalog buying" is conducted by purchasing agents who have little or no knowl-

"Phil just can't get used to the new overhead sand delivery"

Circle 742 on Page 51

Circle 743 on Page 51→

Sharper casting detail with FEDERATED phosphor copper. When you add phosphor copper to reduce porosity, increase castability, and assure sharper detail, guarantee yourself finest performance with Federated quality material. Like the famous Federated line of aluminum and copper base alloys, phosphor copper is produced under the strictest metallurgical controls in the industry. It is stocked as shot or waffle in a nation-wide network of warehouses for immediate shipment. Federated Metals Division of American Smelting and Refining Company, 120 Broadway, New York 5, N. Y. In Canada, Federated Metals Canada, Ltd., Toronto and Montreal.

FEDERATED METALS DIVISION OF

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®PERMABRASIVE

is the only pearlitic malleable shot and grit on the market!

FREE
EXPENDABLE PALLET PACK

Forty 50 lb. cartons in one master pack: easy to store, easy to inventory, easy and safe to handle. **No Extra Cost to you.** (Also in conventional 100 lb. or 50 lb. bags.)

FREE
TEST SAMPLE KIT

A free, no-obligation, lab analysis on your blastcleaning efficiency. See where your money goes. **No Cost to you.**

Result? More durable structure, greater resistance to breakdown, longer life, greater cleaning ability, lower abrasive costs, lower maintenance costs, faster cleaning.

®PERMABRASIVE is better than steel shot and grit because it contains more cutting carbides producing a much, much faster cleaning time; add its lower price and you have an obvious savings in costs!

®PERMABRASIVE is better than ordinary annealed shot and grit because it has more cutting carbides and less graphitic carbon—because it has less phosphorus content indicating a resistance to breakdown—and because the cutting carbides are held in a unique ductile matrix; this means a much, much longer abrasive life with an obvious savings in costs!

USERS SAY

"Using (blank) annealed abrasive, the consumption per wheel-hour was 18.4 lbs.; with PERMABRASIVE the consumption was 14.7 lbs. . . . a reduction of 20.1%."

"We checked the performance of PERMABRASIVE vs two brands of Steel Shot. Results:

PERMABRASIVE . . . $.81, Steel Shot—Brand A . . . $1.48, Steel Shot—Brand B . . . $1.04."

"Used PERMABRASIVE in test against mixture of Steel and Annealed Shot. Abrasive cost per wheel-hour with PERMABRASIVE was $.93, against $1.17 for the mixture . . . a savings of 20.5%."

Please look for us at the Foundry Show—Cleveland, May 19-23. Booth 219 Arena

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METAL ABRASIVE COMPANY
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Sole manufacturers of
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WRITE DEPARTMENT 9-A.

edge of the foundries they represent, the purchase of misfits is understandable, but in the USA, we are not buying a cat-in-a-bag. We enjoy the benefit of expert technical advice. We are supplied with trade literature which answers every imaginable question concerning the installation we contemplate, and usually we are welcome to visit a neighboring plant where the very machine we have in mind is performing as promised.

Pays Dividends—I know of some—and there are undoubtedly many—foundrymen operating small jobbing foundries who long had felt the need for a larger muller, a better molding machine, or individual overhead sand units—machines that might be adaptable to older buildings. After much debate, the machine in question eventually was purchased and put into service, paying dividends that even exceeded the promises of the manufacturer.

In one instance, which might be considered exceptional, manhour production was increased 100 per cent, casting loss was noticeably reduced, and the molder or machine operator actually expended less energy than the job previously had required. I mention this one instance, which I consider exceptional, but there are many others in which a 25 to 50 per cent increase in production has been recorded and in which the machines paid for themselves in comparatively short periods. The designers of foundry machinery are displaying ingenuity that certainly deserves encouragement.

Experimenters—The first man to eat an olive or an oyster must have been either very brave or very hungry. It is understandable that man should be skeptical in embarking on the unknown, yet we must admit that every tool in the foundry once was a questionable experiment. As its value became recognized, skepticism vanished, and the new tool was soon considered indispensable. So it will be with machines and implements that now are only on the drawing board.

Much molding sand today is being but partially reconditioned. Some of the active clay and other additives are being sacrificed by machines that do not perform their intended functions adequately. If the casting buyer is to become more and more discriminating, the foundryman must insist on machinery and equipment capable of meeting the new requirements. Much is now available; more will be developed or is being developed.

for an interesting,
educational, instructive
hour at the

Castings Congress and Foundry Show

Cleveland Public Auditorium

May 19th to 23rd

---

plan to attend actual
operating demonstration
and lecture on

AIR CONTROL TECHNICS

Basic and unique methods in controlling pneumatic power in today's industry

all seats reserved—
Send request to ROSS—Detroit
or contact ROSS at the show,
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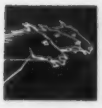

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OPERATING VALVE CO.

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MAIL THIS TODAY!

Please reserve_____seats for one hour lecture on **AIR CONTROL TECHNICS** at the Castings Congress and Foundry Show.

	MON	TUES	WED	THURS	FRI
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P. M.	☐	☐	☐	☐	☐

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Company_____

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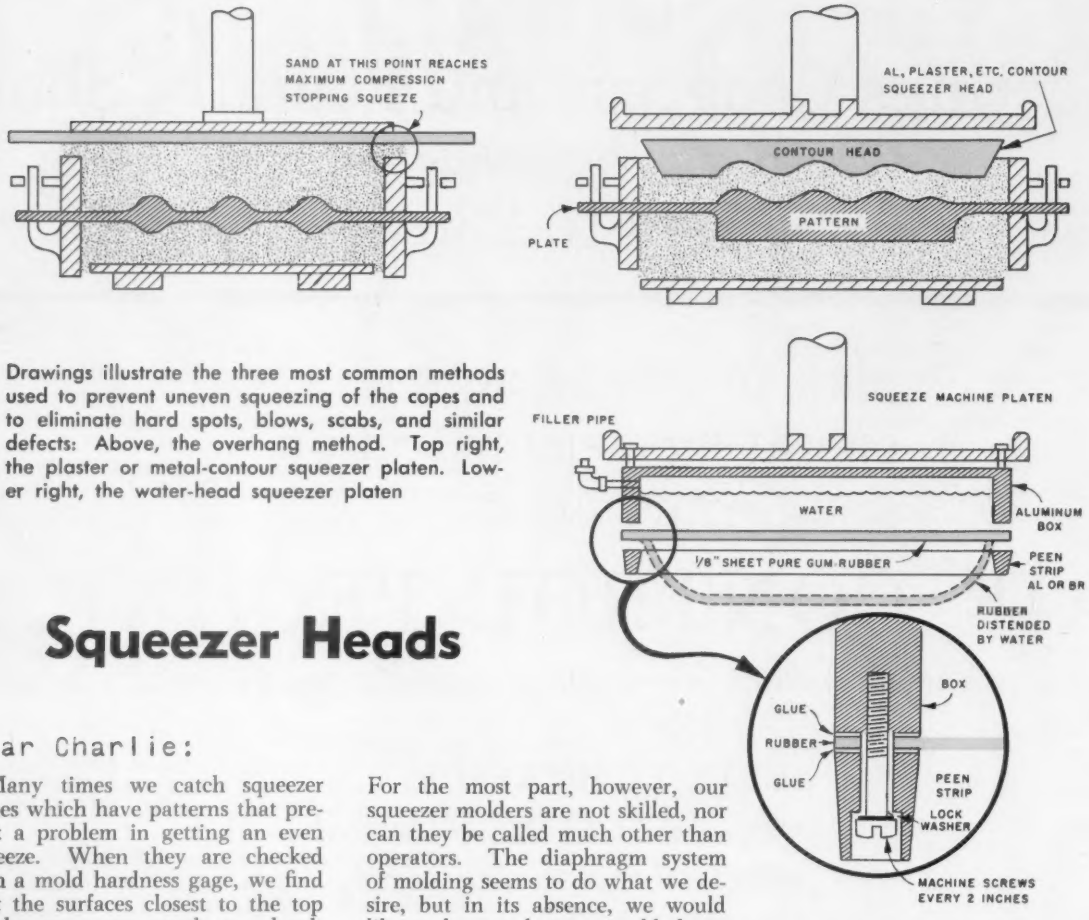
City_____ Zone_____ State_____

Circle 745 on Page 51

Trouble Shooting

By C. W. AMMEN



Drawings illustrate the three most common methods used to prevent uneven squeezing of the copes and to eliminate hard spots, blows, scabs, and similar defects: Above, the overhang method. Top right, the plaster or metal-contour squeezer platen. Lower right, the water-head squeezer platen

Squeezer Heads

Dear Charlie:

Many times we catch squeezer plates which have patterns that present a problem in getting an even squeeze. When they are checked with a mold hardness gage, we find that the surfaces closest to the top of the cope are much too hard, whereas closer to the parting the mold may be excessively soft.

We are aware that a skilled squeezer molder can prevent this occurrence by relieving those areas which would come up hard, etc. For the most part, however, our squeezer molders are not skilled, nor can they be called much other than operators. The diaphragm system of molding seems to do what we desire, but in its absence, we would like to know what we could do to effect an even squeeze with our existing jolt squeezers. We have tried lots of things—even foam rubber. Each makeshift had its good point, and each had some failings.

Sincerely,
Sam

Dear Sam:

We all try our best to devise methods and equipment by which we can offset the lack of skill or knowhow—not only to increase our yield of good castings, but, if possible, to permit use of cheaper help, etc. I have seen some good squeezer hands who were not only top-pay boys but extremely slow. In many shops today, only one or two molders are able to handle any plate that is much more than a flatback.

This condition is not good. The foundry has lost many products to other methods or materials because of the advanced mechanization and elimination of the need for skilled people in these other fields. Many products remain in the foundry today only because a cheaper method, material, or process has not been found as yet to substitute for the casting. Of course, some come back after a period in another material or method; so all is not black. But I am a bit off the subject at hand. Let's get down to your squeezer problem.

I believe I have seen more different rigs used to effect an even squeeze than any other contraptions applied to molding machines. Also, I believe that where maintenance is concerned, the squeezer is the most neglected piece of equipment in the foundry. It usually is taken care of only when it just up and quits. Even then, only the minimum amount of work necessary to get it going again is done. I have molded on machines which were in such bad shape that they wouldn't make a good bench, much less do what their manufacturer intended them to do.

These are the three most com-

TISCO® REPLACEMENT BLADES

to fit WHEELABRATORS*

5 WAYS BETTER

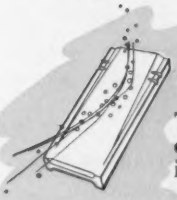
TISCO Replacement Blade — Manufacturers part numbers 36473 and 154069.

TISCO Replacement Blade — Manufacturers part numbers 47130 and 143600.

TISCO 150-Y High Chrome Alloy blades are "super-hard" for severe abrasion.

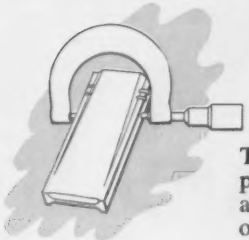
THICKER

Thick TISCO blades take constant abrasion in stride, outlast competitive blades.



LONGER-WEAR

TISCO blades outwear others 6 to 1, save money in the same ratio!



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Circle 747 on Page 51

mon methods, other than blocked and relieved squeezer boards, used to prevent uneven squeezing of the copes and to prevent hard spots, blows, scabs, etc.: 1. The overhang method which is used by many shops making plumbing ware, light fittings, etc. 2. The plaster or metal-contour squeezer platen. 3. The water-head squeezer platen.

The first method is used frequently, but does not effect an even ram. It helps only to prevent excessive hard spots and still requires skill on the part of the operator in placing the proper amount of sand correctly in the flask. It is very hard on flask equipment and plates and produces wide differences in cope to drag hardnesses. It involves squeezing the cope with a board or platen which does not fit into the cope, but is as large as the outside dimensions of the cope flask. The sand is heaped up in the cope and squeezed; the sand that falls between the platen and the top rim of the cope comes up tight, and there the squeeze stops. The degree of hardness in the cope depends therefore on the amount and height of the sand placed in the cope prior to squeezing.

This result also is accomplished with less strain by adjusting the machine's squeeze limit. Thus the hardness with the squeezer board inside depends entirely on how much sand is put in the cope. Although this method is used in many shops, I do not recommend it myself.

The plaster or metal-contour platen is simply a squeezer head which represents the general contour or shape of the patterns on the cope face of the plate. The cope side of the pattern plate is boxed in with a suitable frame. The pattern is given a coat of lard or any other shortening.

It then is covered with a $\frac{1}{8}$ or 1/16 in. thickness of sheet wax which has been softened by holding it over steaming water until it is sufficiently limp to work. In covering the cope patterns, simply follow the general shape or contour. Trim the wax to fit the inside of the frame when the wax is hard (this can be accomplished by applying cold wet rags), and fill the frame with plaster or one of the cast stone compounds sold to the trade for such work. Properly reinforced, this can be used as a contour squeezer platen, or it can be given suitable draft, shellac, etc., and be used as a pattern to produce one of aluminum.

This method is very effective, but has the disadvantage of requiring a

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platen for each different pattern plate. Some shops make these up in plaster in a frame, screw it to a suitable board, and use it as is, without mounting it to the machine.

Remember, with a contour platen fixed to the machine, you must put stops on the squeezer table in order to assure proper alignment prior to squeezing.

The third and most flexible and effective method in my opinion is the best by far in the long run. It requires a cast aluminum box made to the correct size to come within the inside of the cope, clearing the inside dimensions of the flask by 1/4 in. all around. The open face is covered with a piece of pure gum rubber 1/8 in. thick which is attached to the box by a cast peen strip through which suitable screws pass. The box also is fitted with a suitable fitting on one end, close to the top, to fill it with water. The rubber is put on relaxed—that is, the rubber is not stretched on, but is laid out on a flat surface and cut to size.

After the assembly has been attached to the squeezer platen, sufficient water is put in to cause the rubber diaphragm to hang down about 3 1/4 in. from its level position. The exact amount of water must be determined by experimentation. For flasks with a cope from 12 x 12 to 12 x 18 in., with a cope from 2 1/2 to 6 in. deep, 2 1/2 to 3 in. seems to work well.

Place enough sand in the cope so that it can be struck off level, to take a weight, after squeezing. This point applies as well to snap or rigid flasks. As with the metal-contour platen, stops must be located to position the flask. A rubber set sprue or pop-up type works well with this system.

The dimensions given are general. Please don't take them as absolute. You have to fiddle around and work up what suits your case best.

Don't, however, expect your molders to produce with any great degree of success if your molding machines are in poor, wornout shape, held together with baling wire or such. You must squeeze parallel. Be sure the platen and tabletop come parallel throughout the squeeze stroke. Many a molder has been eaten out about ramoffs caused by a bum machine over which he had no control.

Sincerely,
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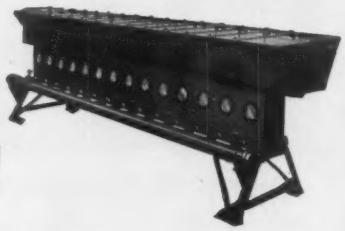

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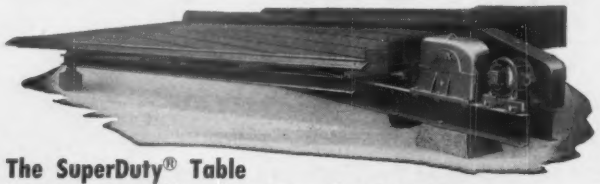

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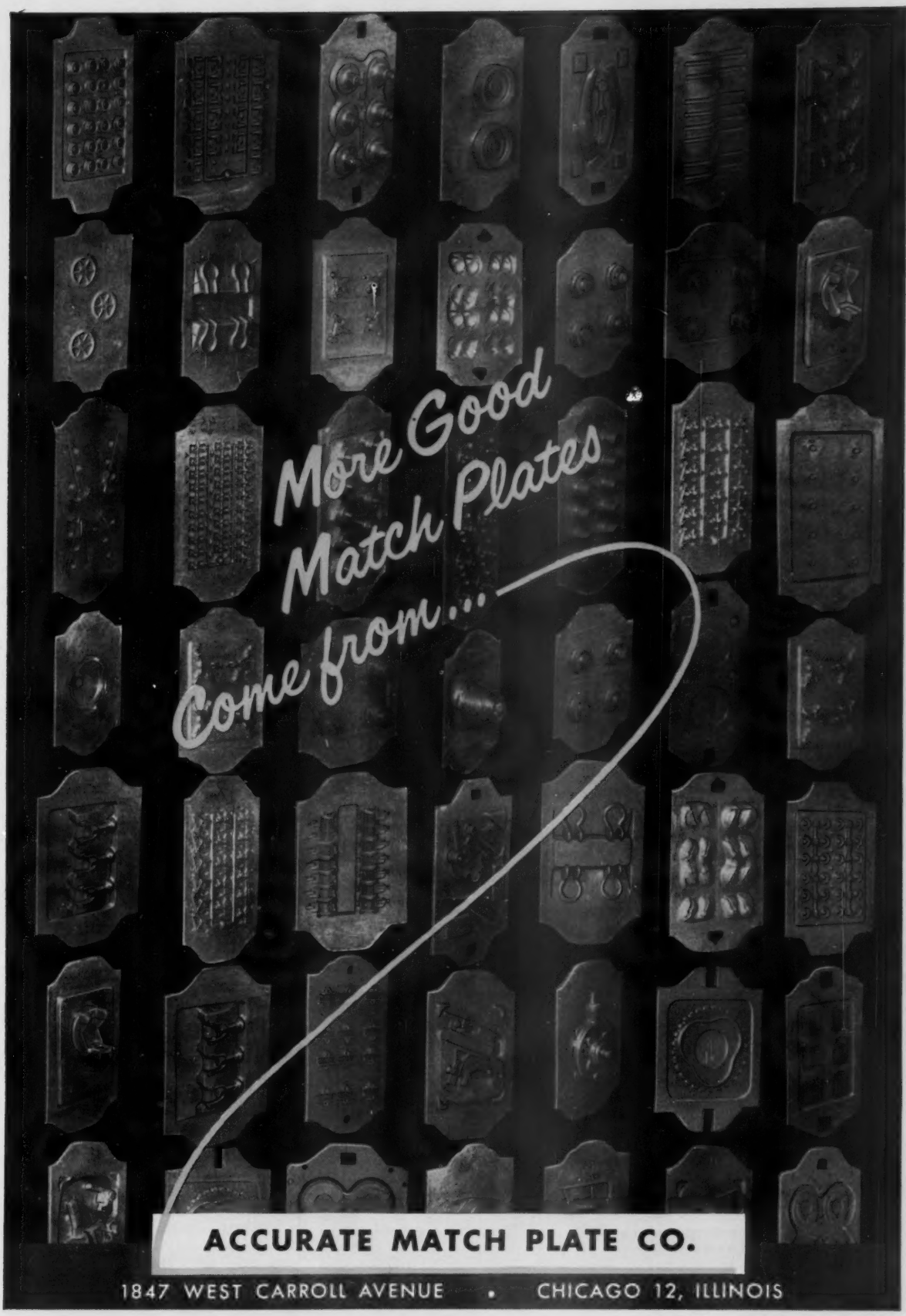
Gray Iron Foundry Practice Subject of Study Course

"Gray Iron Foundry Practice," a new home study course, has been added to the list of courses now being offered by Metals Engineering Institute, a division of the American Society for Metals, Cleveland.

Written by Prof. W. P. Winter, Pennsylvania State University, and Dr. D. C. Ekey, Georgia Institute of Technology, "Gray Iron Foundry Practice" covers present-day casting processes in 15 authoritative lessons. Patterns, cores, sands, melting practice, cleaning, inspection, and control are discussed fully. Also included are important lessons dealing with the metallurgy of casting.

The course and the resources of the American Society for Metals and its institute are available to individuals on a correspondence basis or to training directors and employers for classroom use in sales instruction, on-the-job and in-plant training. For further information, write Metals Engineering Institute, 7301R Euclid Ave., Cleveland 3, Ohio.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New Books for Foundrymen . . .

NONFERROUS METALS

1957 Supplement to Book of ASTM Standards, Part 2, NONFERROUS METALS, 378 pages, 6 x 9 in., published by the American Society for Testing Materials, Philadelphia 3. Price $4.

Since issuance of the 1956 *Supplement,* about 56 standard and tentative specifications for nonferrous metals have been revised and accepted by the society. They are presented in the new 1957 *Supplement.*

In the foundry field one specification relates to brass diecastings; two to zinc-base ingot and diecastings; four to aluminum-base ingot, sand castings, permanent mold castings, and diecastings; and four to magnesium-base ingot, sand castings, permanent mold castings, and diecastings. The book includes yellow stickers for affixing in the specified places in the 1955 *Book of Standards* and the 1956 *Supplement* to indicate the changes.

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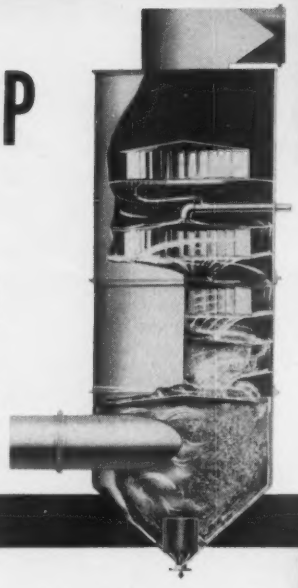

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FERROUS METALS

1957 Supplement to Book of ASTM Standards, Part 1, FERROUS METALS, 504 pages, 6 x 9 in., published by the American Society for Testing Materials, Philadelphia 3. Price $4.

This volume contains revised standards and the new and revised tentatives on ferrous metals that have been accepted by the society since the appearance of the 1956 *Supplement.* About 75 specifications are included, of which 9 relate to steel castings and one to cast iron.

The book also contains yellow stickers for affixing in the appropriate places in the 1955 *Book of Standards* and the 1956 *Supplement* to indicate the specific changes which are incorporated in the new supplement.

RADIOISOTOPES

RADIOISOTOPES, 100 pages, 6 x 9 in., published by the American Society for Testing Materials. Price $2.75.

A symposium of ten papers and discussion on testing techniques utilizing radioisotopes. Included are "Electroplating and Metal Preservation Studies Utilizing Radioisotopes" by S. L. Eisler; "Evaluation of Rubber Deterioration by Means of Phosphors-32" by J. F. Young and C. W. Richards; "Autoradiography as a Testing Technique" by M. J. Schlesinger and H. J. Gomberg; "Use of Radioactive Tracers in the Study of Soil Removal and Detergency" by E. B. Ashcraft.

"Refinery Scale Applications of Radioactive Tracers" by V. P. Guinn, H. R. Luknes Jr. and C. D. Wagner; "Activation Analysis for Industry" by A. De Haan; "Thickness, Density, and Concentration Gaging with Radioisotopes" by R. L. Newacheck, J. Kohl, and D. L. Forrest; "Will ASTM Standards be

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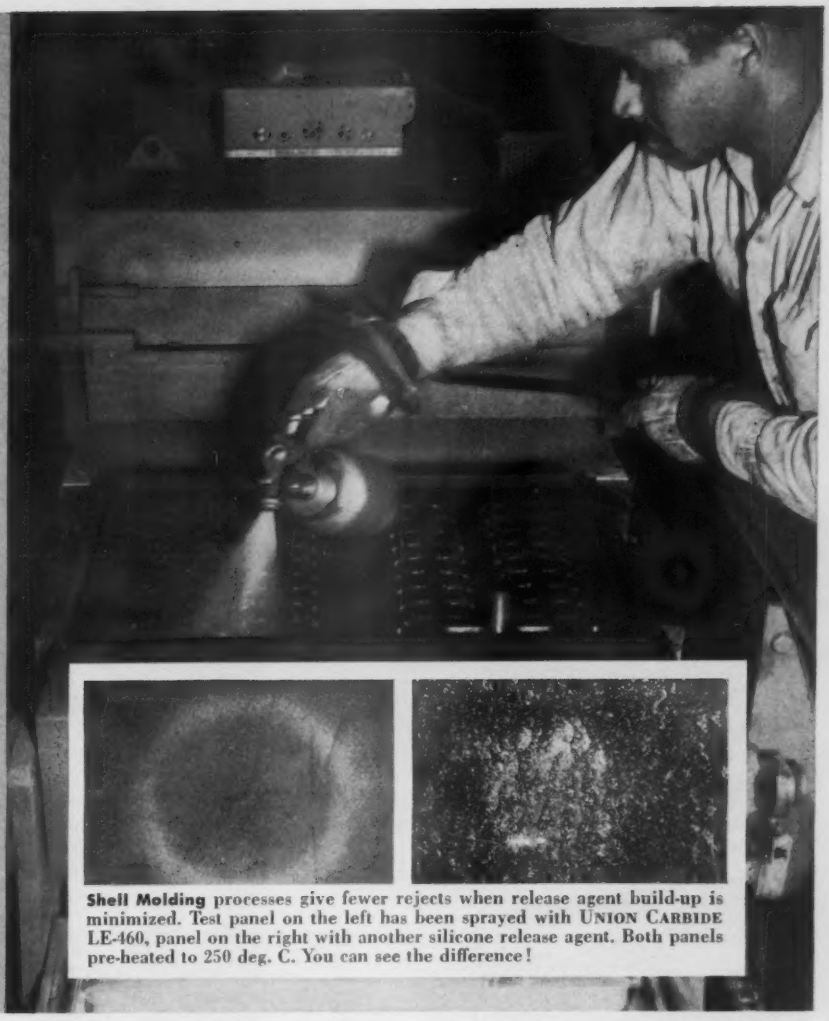

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Influenced by Radiation Effects in Metals?" by J. C. Wilson and R. G. Berggren; "The Problem of Establishing Specifications for Irradiated Organic Materials" by O. Sisman, and "General Discussion" by P. C. Aebersold.

NONFERROUS CASTINGS

METALLURGICAL ASPECTS OF THE CONTROL OF QUALITY in NON-FERROUS CASTINGS, 148 pages, 8½ x 11 in., published by the Institute of Metals, 17 Belgrave Square, London S.W. 1, England. Price $5.50.

Contains eight papers and discussions presented at a symposium on quality control of nonferrous castings held during the 1957 annual meeting of the Institute of Metals. Papers and subjects include: "The Metallurgical Principles of the Control of Quality of Non-Ferrous Castings" by R. W. Ruddle; "The Role of Statistical Methods in Controlling the Quality of Non-Ferrous Castings" by A. R. Martin; "Metallurgical Control of Quality in the Production of Aluminum Alloy Castings" by A. V. Carless; "The Metallurgical Control of Quality in the Production of Copper-Base Alloy Castings" by A. R. French.

"The Control of Quality of Magnesium-Base Alloy Castings" by E. F. Emley; "Control of Quality in the Production of Nickel Alloy Sand Castings" by D. R. Wood and J. F. Gregg; "The Control of Quality of Pressure Die-Castings" by H. J. Sharp; and "Non-Destructive Testing in the Control of Non-Ferrous Castings" by S. L. Fry.

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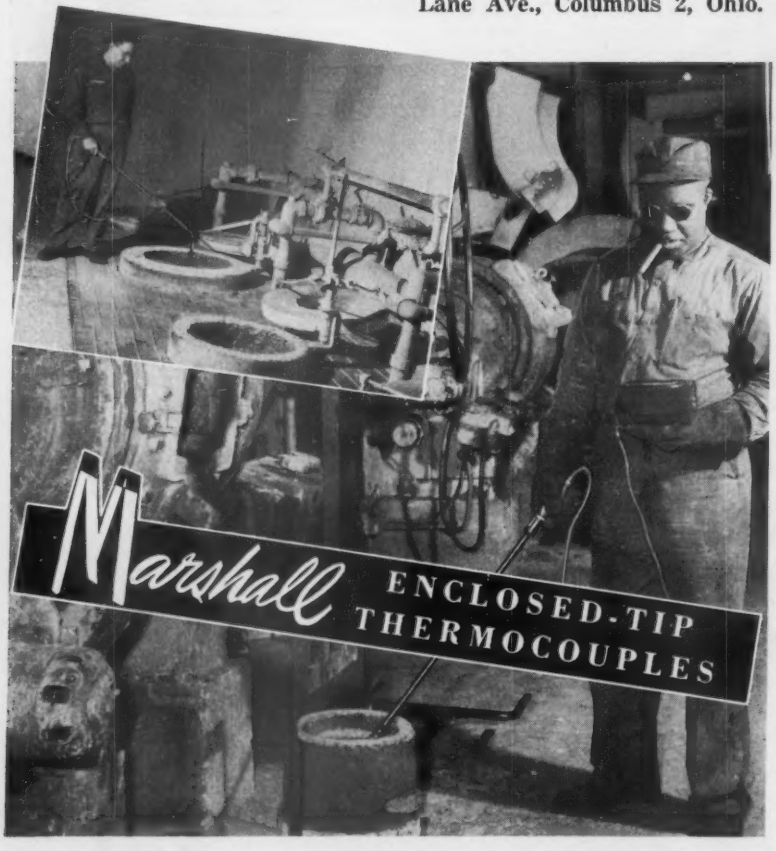

ANALYSIS OF MATERIALS

ION EXCHANGE AND CHROMATOGRAPHY IN ANALYTICAL CHEMISTRY, 62 pages, 6 x 9 in., published by the American Society for Testing Materials, Philadelphia 2. Price $2.25.

First of a series of annual symposia planned on timely subjects concerned with analysis of materials, this book describes methods available or under development for ion exchange and chromatography. Papers include "Ion-Exchange in Analytical Chemistry" by Rober Kumin, "Ion-Exchange in Analytical and Radiochemistry" by J. E. Hudgens Jr., and "Metals Separation by Anion Exchange" by K. A. Kraus and F. Nelson.

NONFERROUS ANALYSIS

RAPID ANALYSIS OF NONFERROUS METALS AND ALLOYS, by George Norwitz, published by Chemical Publishing Co., 212 Fifth Ave., Dept. 304, New York 10, N. Y. Price $4.25.

Accuracy, simplicity, and reliability make the book valuable to trained chemists and routine operators. There is an increased reliance on sequence procedures, and use of mathematical correction factors eliminates lengthy separations. Information covers special reagents, brasses and bronzes, alloys, Monel and nickel, zinc, cadmium, tin, lead, solders, and bismuth.

APPLIED METALLURGY

APPLIED METALLURGY FOR ENGINEERS, by Malcolm S. Burton cloth, 407 pages, 6 x 9 in., published by McGraw-Hill Book Co., New York. Price $7.50.

Designed as a college textbook for teaching the elementary principles and applications of metallurgy to engineering students, the book develops the background of the

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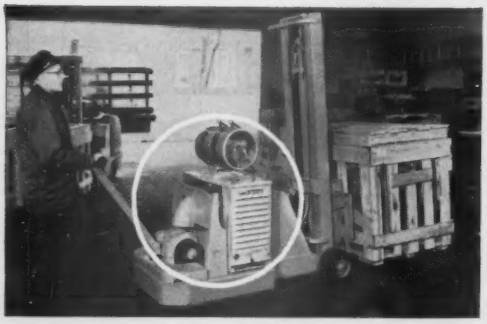

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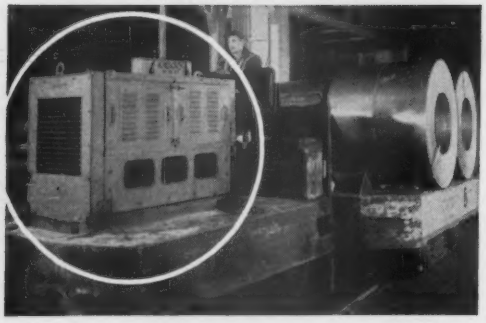

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science of metals and outlines the application to casting, metalworking, welding, heat treatment, and powder metallurgy.

Divided into 21 chapters, the book begins with brief discussions of the nature of metals and then treats production of metals, examination and testing, alloys and alloying, equilibrium diagrams, heat treatment, and various methods of processing metals. The last stresses the principles rather than the techniques, but sufficient details of the methods are provided to acquaint the student with modern processing practices. In that section four chapters are devoted to the foundry field, discussing foundry metallurgy, casting processes, molding materials, and foundry technology. Those chapters are well written, brief and to the point, and will provide the reader with a good understanding of the basic principles underlying casting production.

ASTM STANDARDS

1957 Supplement to Book of ASTM Standards, Part 4, Paint, Naval Stores, Cellulose, Wax Polishes, Wood, Acoustical Materials, Sandwich and Building Constructions, Fire Tests, 209 pages, 6 x 9 in., published by the American Society for Testing Materials, Philadelphia 3.

Contains 37 extensively revised standards and the new and extensively revised tentatives in the mentioned fields which have been accepted by the society since publication of the 1956 *Supplement*. Yellow stickers are included for affixing in the proper places in the 1955 *Book of Standards* and the 1956 *Supplement* to draw attention to changes.

SPECTROCHEMICAL ANALYSIS

METHODS FOR EMISSION SPECTROCHEMICAL ANALYSIS, cloth, 504 pages, published by American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price $7.

This second edition brings up to date the first extensive compilation of emission spectrochemical methods published by ASTM in 1953. It covers the spectrochemical analysis of the most important ferrous and nonferrous metals and alloys as well as several nonmetallic materials such as slags, ceramics, caustic liquor, petroleum products, etc.

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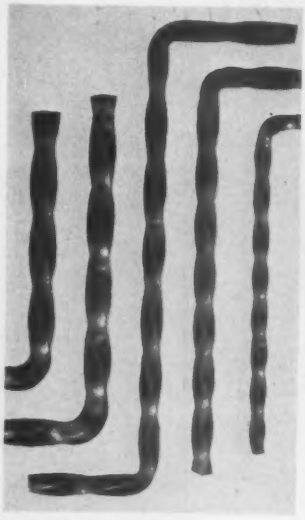

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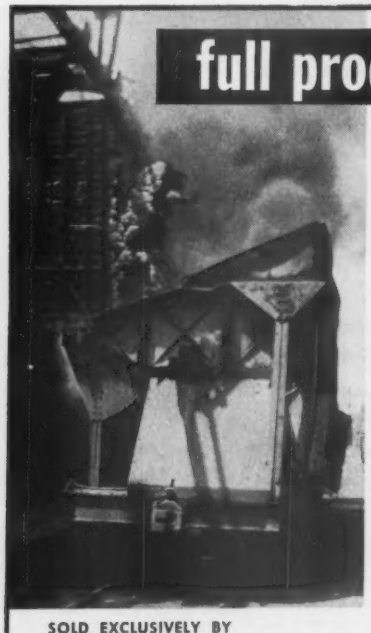

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Expect the high carbon, the low reactivity and ash you want. Cleanly sized over modern vibrating screens. Has ability to maintain optimum operating bed height in the cupola — and full melting efficiency. Ask for current analysis.

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tions, are provided. In addition to 65 suggested practices and methods, 16 recommended practices and tentative methods are given. Particular emphasis has been placed on specifying spectral exposure conditions, excitation conditions, and analytical pair data.

MATERIAL HANDLING

MATERIALS HANDLING HANDBOOK, edited by Harold A. Bolz, 1700 pages, 6 x 9 in., published by Ronald Press Co., 15 East 26th St., New York 10, N. Y. Price $20.

This volume was prepared under sponsorship of the American Material Handling Society and the Materials Handling Div., American Society of Mechanical Engineers. The editor was assisted by George E. Hagemann, past chairman of ASME's Materials Handling Division, as associate editor. Mr. Bolz is associate dean, College of Engineering, Ohio State University. In preparation for more than five years, the project was under direction of a joint committee of ASME and AMHS members, with Herbert H. Hall, Aluminum Co. of America, as chairman.

Most of the progress made in material handling has been covered by the many individuals who contributed to the book. Illustrated with photographs, charts, tables, and diagrams, it is divided into 47 sections. Included are methods of analyzing handling problems, principles, procedures, and techniques for effective operation and control; systems design and installation; integration of materials handling activities with the manufacturing processes; and the design, selection, and classification of material handling equipment.

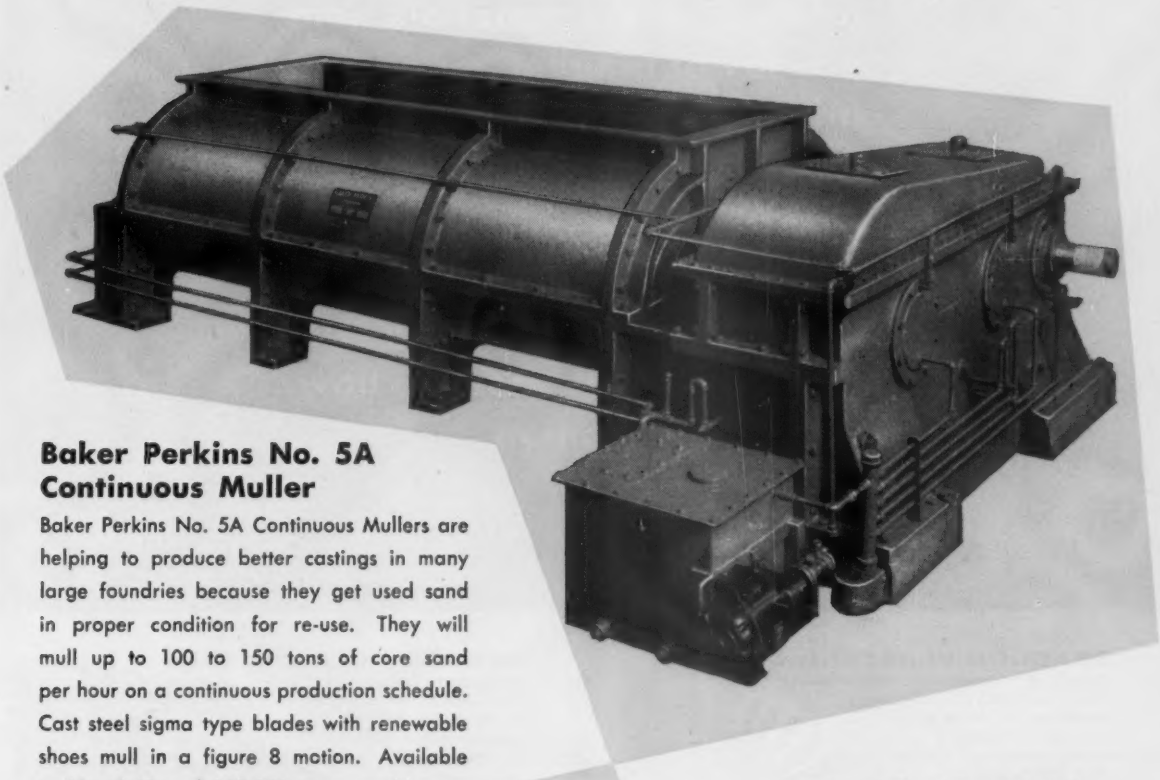
ENGINEERING FORMULAS

ENGINEERING FORMULAS AND TABLES, loose leaf, 6¾ x 3¾ in., 396 pages, published by Lefax Publishers, Ninth & Sansom Sts., Philadelphia 7, Pa. Price $4.75.

A pocket-sized, newly revised reference manual replaces heavy books too bulky to carry. Newly revised, it contains basic formulas, design data, and tables for civil, mechanical, and electrical engineering.

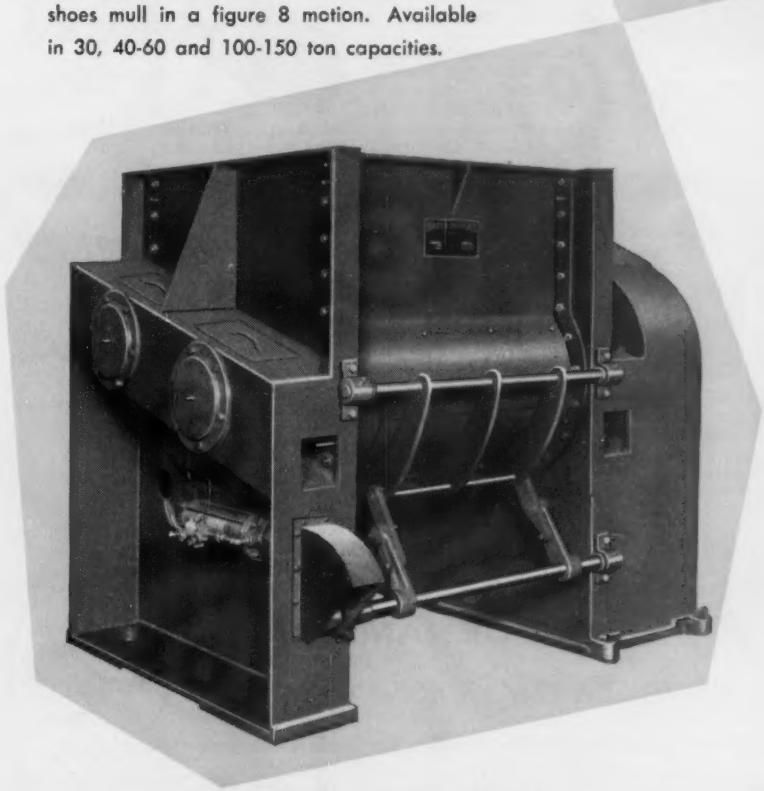
Sections cover mathematics, measures, materials, gages, screws, mechanics, electricity and magnetism, hydraulics, structural data, reinforced concrete, pipe and fittings, steam, and mathematical tables. Celluloid tabbed indexes are provided.

Two Baker Perkins sand handling units that help to improve casting quality



Baker Perkins No. 5A Continuous Muller

Baker Perkins No. 5A Continuous Mullers are helping to produce better castings in many large foundries because they get used sand in proper condition for re-use. They will mull up to 100 to 150 tons of core sand per hour on a continuous production schedule. Cast steel sigma type blades with renewable shoes mull in a figure 8 motion. Available in 30, 40-60 and 100-150 ton capacities.



Baker Perkins Unidor Core Sand Mixers

In smaller foundries these batch type mixers can help improve the core sand and thus give better casting quality. They rub, stir and knead all in one operation, distributing a thin layer of bond around each grain to assure 100% benefit from bonds, oils, binders and other compounds. Available in 5½ to 35 cu. ft. working capacities.

BAKER PERKINS INC.
FOUNDRY MACHINERY DIVISION
SAGINAW, MICHIGAN

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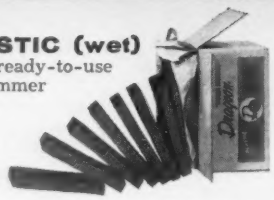
Circle 776 on Page 51

Q. How can DRAGOON "carbon fortified" lining materials help you lower maintenance costs... improve metal quality?

A. DRAGOON forms a long-lasting, penetration-resistant lining that prevents slagging, bridging, skulling... lubricates the flow... keeps metal clean.

DRAGOON PLASTIC (wet)
comes in convenient, ready-to-use slices for hand or air hammer ramming. Forms a solid monolithic lining in wells, ladles and spouts that will not shrink, crack or erode out. Reduces lining repair . . . promotes cleaner equipment . . . cleaner metal.



Packed in 100 lb. moisture-proof carton

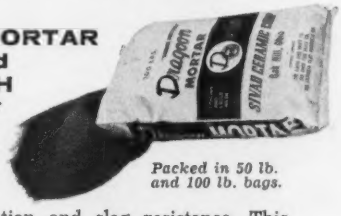
DRAGOON PLASTIC (dry)
is mixed with water to any consistency for ramming. It can be rammed in against safety linings to form a solid refractory structure that will not shrink away or spall. It reduces maintenance costs through easy installation . . . long service life. It's an ideal product for gun application.

Packed in 50 lb. and 100 lb. bags.

DRAGOON CARBON CUPOLA BLOCK
outlasts other refractory block 5 to 1. This exclusively formulated, carbon-fortified block will give superior service in cupola wells, spouts and ladle linings. Heat of the molten metal forms a fused surface on the hot face of the block, entrapping the carbon and preventing oxidation. This tough shell resists slagging, abrasion and penetration, yet allows carbon to come through lubricating each heat. The result is extended service life . . . cleaner, easier casting.

Available in all standard cupola blocks and special sizes.

DRAGOON MORTAR COATING and LADLE WASH
is mixed with water for spraying or brushing on over existing linings. It forms an impermeable coating for lubrication and slag resistance. This product will more than pay for itself by eliminating liner repairs when used as a wash coat for ladles and spouts.



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TEST DRAGOON PRODUCTS under your own conditions and prove their superior workability and service features. Write for complete information.

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SIVAD CERAMIC Corp.
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QUALITY THROUGH CONTROL

Associated Companies: The Davis Fire Brick Co., The Ohio Fire Brick Co., The Cambria Clay Products Co.

Look us up, Booth No. 209, Foundry Convention, Cleveland, May 19-23

Foundry Statistics

ALUMINUM

(Shipments of castings—1000 pounds[1])

	Shipments				Unfilled Orders[2]
	Total	Sand	Perm. Mold	Die	
1956	794,581	171,181	245,421	376,230	.....
1957					
Jan.	72,999	14,201	20,963	37,194	116,088
Feb.	69,451	13,366	21,707	34,311	107,869
Mar.	74,527	13,914	22,974	37,521	107,963
Apr.	68,284	14,287	20,376	33,493	98,113
May	65,108	12,705	20,708	31,602	94,748
June	58,547	11,585	17,180	29,700	88,086
July	52,173	10,447	16,322	25,339	89,430
Aug.	55,735	10,996	18,398	26,319	89,826
Sept.	58,692	11,367	17,820	24,900	93,720
Oct.	64,140	11,570	20,543	31,936	91,817
Nov.	58,898	10,411	18,611	29,793	91,860
Dec.	53,102	9,302	16,724	26,978	86,323
Total	751,656	144,151	232,326	369,086	.....
1958					
Jan.	57,845	10,724	18,082	28,937	77,067

MALLEABLE IRON

(Shipments of castings—net tons[1])

	Shipments		Standard		Pearlitic		Unfilled Orders[2]
	Total	For Sale	Total	For Sale	Total	For Sale	
1956	951,868	557,636	812,905	466,845	138,963	78,073	.....
1957							
Jan.	85,977	51,508	71,689	43,401	14,288	8,107	93,886
Feb.	78,028	46,729	65,411	39,590	12,617	7,139	90,725
Mar.	78,013	48,311	64,560	28,915	13,453	7,666	89,431
Apr.	80,271	51,320	65,990	42,810	14,281	8,510	83,116
May	76,504	46,277	63,058	38,072	13,445	8,205	79,787
June	72,556	44,639	59,829	36,892	12,727	7,747	76,331
July	57,748	34,876	45,101	27,290	12,648	7,586	80,694
Aug.	65,426	39,644	55,320	33,781	10,106	5,863	84,876
Sept.	62,457	38,397	52,281	31,658	10,176	6,739	83,385
Oct.	77,667	45,989	66,043	39,269	11,624	6,720	82,995
Nov.	67,904	38,065	55,564	31,036	12,340	7,049	80,074
Dec.	60,425	34,343	48,694	27,218	11,731	7,125	74,863
Total	862,976	520,118	713,540	414,932	149,436	88,356	.....
1958							
Jan.	62,734	34,920	51,440	28,516	11,294	6,404	67,292

COPPER-BASE ALLOY

(Shipments of castings—1000 pounds[1])

	Shipments			Unfilled Orders[2]
	Total	Sand	Perm. Mold	
1956	966,306	866,545	57,522	.....
1957				
Jan.	82,025[3]	73,202	4,510	57,422
Feb.	72,084	64,346	4,188	54,133
Mar.	77,418	69,258	4,445	49,135
Apr.	77,167	69,141	4,316	48,148
May	75,347	67,251	4,421	46,791
June	70,959	63,910	3,590	44,232
July	60,621	54,847	3,010	44,175
Aug.	71,233	64,953	3,278	40,446
Sept.	70,804	64,470	3,243	40,298
Oct.	81,836	74,391	3,693	39,063
Nov.	70,187	63,944	3,006	34,249
Dec.	65,708	59,606	3,046	31,509
Total	875,389	788,319	44,696	.....
1958				
Jan.	69,707	63,294	3,327	30,341

MAGNESIUM

(Shipments of castings—1000 pounds[1])

	Shipments		Unfilled Orders[2]
	Total	For Sale	
1956	36,168	33,580	....
1957			
Jan.	3,207	3,017	8,245
Feb.	2,661	2,473	8,276
Mar.	2,970	2,804	7,690
Apr.	2,896	2,723	7,542
May	2,832	2,706	7,188
June	2,973	2,817	6,765
July	2,544	2,384	6,964
Aug.	2,315	2,150	6,222
Sept.	2,279	2,071	5,705
Oct.	2,192	2,093	5,318
Nov.	1,920	1,806	4,802
Dec.	1,533	1,408	4,823
Total	30,322	28,452	....
1958			
Jan.	1,881	1,756	5,227

PRODUCTION WORKERS

Estimated Number	Jan. 1958	Dec. 1957	Jan. 1957
Ferrous	181,800	186,900	210,400
Nonferrous	54,700	58,100	69,700
Average Weekly Earnings			
Gray Iron	79.39	83.55	84.99
Malleable Iron	81.90	86.24	86.24
Steel	90.96	93.21	98.18
Nonferrous	90.71	90.45	91.13
Average Weekly Hours			
Gray Iron	35.6	37.3	39.9
Malleable Iron	36.4	38.5	40.3
Steel	37.9	39.0	42.5
Nonferrous	39.1	39.0	40.5

Source: Bureau of Labor Statistics.

GRAY IRON CASTINGS—SHIPMENTS

(Net tons[1])

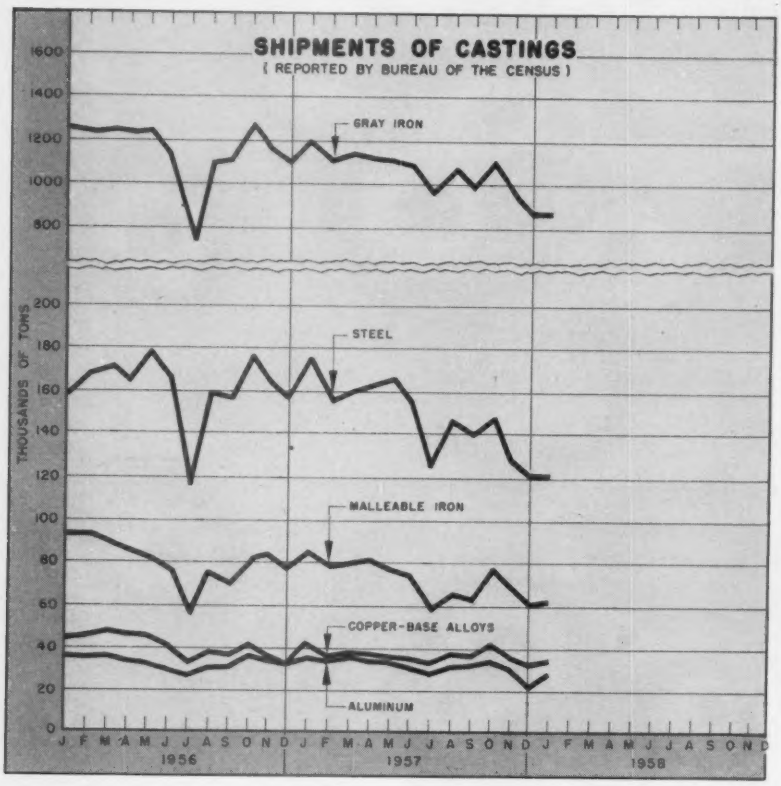
	All Castings		Miscellaneous Castings		Nodular Iron Castings	Heavy Steel Ingot Molds	Chilled Car Wheels	Railroad Pressure Pipe & Fittings	Soil Pipe & Fittings	Unfilled Orders[2]
	Total	For Sale	Total	For Sale	Total	Total	Total	Total[3]	Total[3]	
1956	13,860,527	7,963,135	8,265,526	3,650,735	.....	2,624,146	406,191	1,746,902	817,762	.....
1957										
Jan.	1,213,215	642,317	761,697	320,058	.....	261,961	31,139	101,069	57,346	904,860
Feb.	1,103,118	582,010	705,585	302,514	.....	230,126	30,079	89,146	48,182	931,054
Mar.	1,133,146	604,481	713,767	305,104	.....	214,775	36,995	108,158	59,451	934,847
Apr.	1,120,349	611,443	699,395	298,319	.....	192,199	36,979	128,710	63,066	899,074
May	1,112,096	625,496	674,460	291,557	11,206	192,336	34,406	141,685	69,209	879,825
June	1,058,464	599,494	630,513	274,115	10,207	193,640	32,087	131,360	70,864	853,012
July	954,102	523,489	565,897	243,187	10,901	190,434	31,209	106,532	60,030	825,676
Aug.	1,075,957	596,779	630,130	265,185	10,339	205,655	28,976	238,209	72,987	825,676
Sept.	990,139	563,477	579,444	259,649	10,253	202,911	23,681	119,689	64,411	805,301
Oct.	1,099,554	601,109	668,895	282,024	11,974	210,521	26,306	122,149	71,683	740,169
Nov.	940,138	482,732	599,292	242,847	10,601	166,652	24,302	91,138	58,754	704,623
Dec.	864,226	443,670	557,154	226,356	9,810	148,074	23,173	73,500	62,325	675,838
Total	12,664,504	6,877,497	7,786,229	3,310,915	.....	2,409,284	359,332	1,451,345	758,308	.....
1958										
Jan.	868,255	436,398	580,545	229,014	10,800	135,110	23,511	78,863	50,226	638,069

STEEL CASTINGS—SHIPMENTS

(Net tons[1])

	All Castings			Carbon			Alloy			Unfilled Orders[2]
	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	
1956	1,931,987	1,512,290	368,918	1,444,768	1,122,109	345,091	487,219	390,181	23,827	.....
1957										
Jan.	169,240	133,826	30,090	125,389	98,533	27,739	43,851	35,293	2,351	519,575
Feb.	154,932	121,667	27,181	114,805	89,480	25,060	40,127	32,187	2,121	511,806
Mar.	160,054	124,416	29,968	121,089	93,466	27,683	38,965	30,950	2,285	503,407
Apr.	162,498	124,549	29,708	122,894	93,512	27,624	39,604	32,037	2,084	497,632
May	164,575	125,431	32,840	124,840	94,635	30,926	39,735	30,796	1,914	504,990
June	153,647	119,353	31,338	116,759	91,009	28,766	36,888	28,344	2,572	494,267
July	122,018	90,037	22,803	91,730	67,719	21,426	30,288	22,318	1,377	489,390
Aug.	145,926	111,080	33,641	113,167	86,407	31,639	32,759	24,673	2,002	471,190
Sept.	139,002	105,611	29,718	106,261	80,871	27,885	32,741	24,740	1,863	438,510
Oct.	146,397	113,216	31,477	110,100	85,144	29,320	36,297	28,072	2,157	395,907
Nov.	127,115	98,436	26,892	93,343	71,846	25,105	33,772	26,590	1,787	362,948
Dec.	120,787	92,125	23,403	88,101	66,468	21,808	32,686	25,657	1,595	327,337
Total	1,766,281	1,359,747	349,059	1,328,478	1,019,090	324,951	437,313	342,854	24,108	.....
1958										
Jan.	120,722	94,717	22,545	87,525	68,203	21,115	33,197	26,514	1,430	304,907

[1]Source: Bureau of Census. [2]For sale only. [3]All cast iron pipe is shipped for sale.



COKE PRODUCTION AND CONSUMPTION

(Net tons*)

	Production	Consumption Total	Consumption By Foundries
1956	74,454,264	73,814,941	2,856,395
1957			
Jan.	6,859,657	7,098,041	241,478
Feb.	6,213,577	6,304,315	229,749
Mar.	6,895,077	6,804,267	233,176
Apr.	6,436,259	6,396,886	227,609
May	6,631,807	6,521,105	220,063
June	6,361,611	6,317,615	188,877
July	6,501,595	6,375,616	180,698
Aug.	6,519,973	6,401,949	206,907
Sept.	6,296,519	6,186,475	199,226
Oct.	6,275,567	6,120,485	208,720
Nov.	5,615,746	5,425,296	199,052
Dec.	5,164,965	5,099,556	173,470
Total	75,772,353	74,961,606	2,509,025
1958			
Jan.	4,768,900	4,650,216	192,098

INGOT BRASS AND BRONZE

(Shipments in net tons)

	1957	1958
Jan.	25,681	20,468
Feb.	20,769	17,413
Mar.	21,948	.....
Apr.	23,507	.....
May	22,037	.....
June	18,888	.....
July	16,695	.....
Aug.	19,654	.....
Sept.	19,670	.....
Oct.	22,800	.....
Nov.	19,767	.....
Dec.	16,875	.....
Total for year	248,291	.....

Source: Defense Council of the Ingot Brass and Bronze Industry.

ZINC-BASE ALLOYS

(Shipments of castings—1000 pounds[1])

	Shipments Total	Shipments For Sale	Unfilled Orders[2]
1956	693,728	449,516	.....
1957			
Jan.	67,964	42,189	75,503
Feb.	59,793	36,580	74,739
Mar.	61,378	40,593	64,466
Apr.	54,982	34,801	59,534
May	53,565	35,676	66,712
June	49,356	33,206	64,137
July	48,379	29,418	64,043
Aug.	49,829	34,040	64,789
Sept.	47,736	33,838	68,122
Oct.	62,332	39,990	69,275
Nov.	58,689	35,005	63,665
Dec.	49,597	29,998	58,792
Total	663,600	425,334	.....
1958			
Jan.	50,568	30,368	55,883

INDEX OF FOUNDRY EQUIPMENT ORDERS

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1957	1958
Jan.	117.9	57.9
Feb.	188.4	....
Mar.	127.0	....
Apr.	101.1	....
May	136.2	....
June	187.5	....
July	98.6	....
Aug.	231.3	....
Sept.	113.9	....
Oct.	145.3	....
Nov.	59.6	....
Dec.	61.4	....

Note: Figures are percentages of the base period 1947-49 taken as 100 per cent monthly average. This is a new base period. Source: Foundry Equipment Manufacturers Association.

IRON AND STEEL SCRAP CONSUMPTION

(Gross tons*)

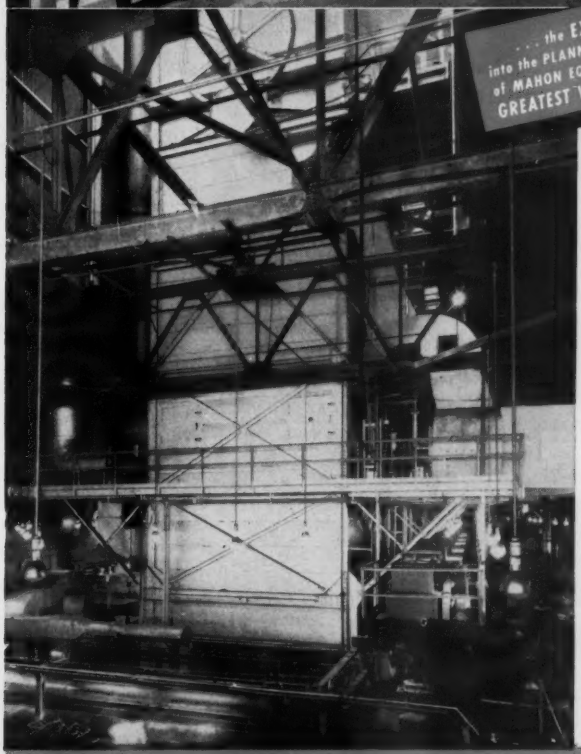
	All Scrap Total	By Types of Furnace — Cupola Total	Air Total	Electric Total
1955	72,654,925	10,786,957	1,273,470	8,757,593
1956				
Dec.	6,264,955	722,320	82,160	851,770
Total	71,709,489	9,817,287	1,133,128	9,862,887
1957				
Jan.	6,630,804	874,764	102,782	927,499
Feb.	6,038,436	804,185	93,902	834,843
Mar.	6,294,038	814,372	92,534	903,149
Apr.	5,816,309	835,027	97,289	807,922
May	5 753,435	812,141	92,260	786,210
June	5,430,607	744,790	80,063	705,590
July	4,897,752	652,773	68,504	629,395
Aug.	5,299,543	765,877	81,941	759,517
Sept.	5,033,998	721,125	82,948	672,597
Oct.	5,333,767	817,338	91,766	718,791
Nov.	4,858,489	716,095	72,871	589,879
Dec.	4,281,414	661,918	70,091	542,008
Total	65,688,592	9,220,405	1,026,951	8,876,400

PIG IRON PRODUCTION AND CONSUMPTION

	Production** (Standard grades—net tons) Total	Foundry	Malleable & Silvery	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace—gross tons) Total	Cupola	Air	Electric
1956	75,301,134	2,402,861	3,733,258	61,900,276	7,264,761	60,571,150	4,419,655	242,144	190,386
1957									
Jan.	7,209,547	135,608	344,073	6,081,137	648,699	6,482,472	423,660	22,989	20,431
Feb.	6,596,133	154,543	294,491	5,414,732	730,794	5,860,099	369,206	20,743	19,443
Mar.	7,179,100	168,650	347,451	6,008,135	654,864	6,155,334	370,915	20,241	23,259
Apr.	6,810,102	162,023	329,180	5,686,507	632,392	5,586,587	369,359	20,495	19,756
May	6,877,052	258,638	313,583	5,720,212	584,619	5,862,966	362,085	19,201	17,869
June	6,593,326	243,789	318,906	5,436,203	594,428	5,672,086	335,574	17,044	17,744
July	6,625,901	221,929	336,590	5,515,736	551,646	5,558,702	306,119	14,735	17,992
Aug.	6,719,763	228,378	298,289	5,451,691	741,425	5,769,995	349,988	17,540	25,948
Sept.	6,569,074	218,297	292,244	5,272,056	786,477	5,645,036	321,728	17,084	28,638
Oct.	6,454,450	164,944	303,104	5,390,851	595,551	5,669,624	354,364	18,466	24,691
Nov.	5,711,242	153,722	290,547	4,759,255	507,718	5,073,898	309,674	14,886	17,199
Dec.	5,212,624	165,268	228,897	4,394,869	423,590	4,565,635	288,219	14,754	13,881
Total	78,557,011	2,275,789	3,697,335	65,131,684	7,452,203	67,902,434	4,160,891	218,178	246,851
1958									
Jan.	4,785,269	100,097	232,862	4,036,451	415,859	.....	.....	.....	.....
Feb.	4,016,276	106,921	193,429	3,396,382	319,094	.....	.....	.....	.....
2 mo.	8,801,545	207,018	426,291	7,433,283	734,953	.....	.....	.....	.....

*Source: U. S. Dept. of Interior, Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only.

CORE OVENS...



In some of the largest and most modern foundries in the world you will find Mahon Core Ovens and other equipment. The illustrations above and at left show part of a battery of twenty-six Mahon Vertical Core Ovens installed in the foundry of one of the world's largest automobile manufacturers. If you are contemplating new core or mold baking ovens, or core dip and paste drying ovens, you will want to discuss your requirements with Mahon engineers . . . because, you, like many others, will find that Mahon engineers are better qualified through experience to advise you on the type of oven best suited to your particular needs. And, if you wish to compare, you will also find that Mahon Core Ovens, like all other Mahon equipment, are better engineered and better built for more economical operation over a longer period of time—a point you will want to investigate thoroughly before making a capital investment in new production equipment. See Mahon's Insert in Sweet's Plant Engineering File, or write for Catalog A-657. And remember, it costs you nothing to discuss your baking and drying equipment requirements with Mahon engineers.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

SALES ENGINEERING OFFICES in NEW YORK and CHICAGO

Engineers and Manufacturers of Core and Mold Baking Ovens, Core Dip and Paste Drying Ovens, Mold Spray Booths, Mold Racks, Core Rack Trucks, Sand Storage Bins and Hoppers, Shake-out Hoods, Cooling Tunnels, Dust and Fume Control Equipment and Filtered Air Supply Systems, Metal Cleaning Machines, and many other units of Special Processing and Production Equipment.

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in 12 minutes
OIL USED : 7/10 gal.

100 lbs.
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in 20 minutes
OIL USED : 1.2 gal.

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furnaces

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See . . . perfect control of metal and temperature. *See* . . . metal loss under 2% for all metals. *See* . . . why no crucibles are needed. Furnace sizes; 50 lbs. to 5,000 lbs. per heat.

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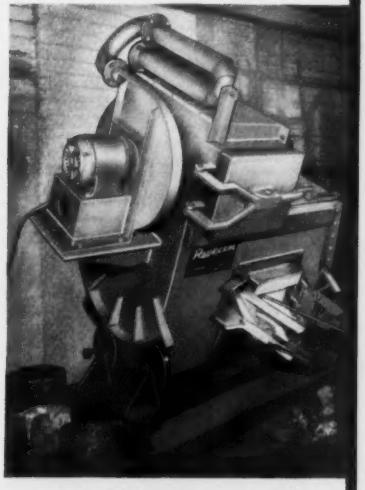
See the Reverbale Dip-Out Furnaces for Aluminum and Brass.



INTERNATIONAL Foundry Supply Co.
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Canadian Representative: Drew Brown Ltd. 5410 Ferrier St., Montreal 9

Circle 764 on Page 51

Reducing Storage Costs Through Proper Handling

Here Are Some Pointers To Help Cut Expenses

By Ernest W. Fair

PLANT managers often overlook some of the most obvious spots where costs can be reduced. One such place, many executives say, is in storage procedures. Losses in this area are particularly high in small firms where storage is looked on as just another inconvenience.

Here are some short cuts used today by both large and small firms which have studied this operation and profited thereby:

1. *Use storage space that provides maximum efficiency.* Don't select merely the most useless corner of your plant.

2. *Make certain everything is easily and quickly accessible.* Delays cost money and help create other expenses, such as those involved in breakage, damage, etc.

3. *Every storage setup should be flexible.* It is difficult in these times to anticipate long-range storage needs.

4. *Store so that counting is easy.* Inventory control costs jump when haphazard storage makes the job a long and tedious procedure. Counting also is necessary at many other times than during inventory periods.

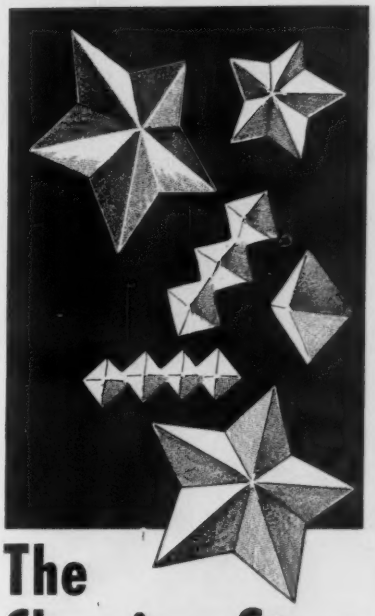
5. *Keep piles regular and uniform.* In some companies the storage room is looked on as a catch-all corner, and goods are dumped into it without plan or any attempt at neatness.

6. *Handling costs should be kept at the minimum.* Items in storage which must be moved about constantly before being put to use are expensive to store. When an item can be set into its niche on arrival and left there until used, its storage costs are kept low.

7. *Protect against the weather.* Even with inside storage, weather damage is possible through improper ventilation, a window left open during a rainstorm, or overexposure to heat.

8. *Provide dividing spaces between items.* Dumping goods side by side makes accessibility to any one item difficult. If dividing space is provided between all such groups, handling is easier, control is more accurate, and damage in storage is reduced materially.

9. *Place units so that labels are visible.* A sign of unsatisfactory storage procedure is to find a store-



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of ABMET, an abrasive resistant metal, last many times longer than chilled or hard iron. A trial order at these attractive prices will convince you.

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SIX POINT STARS

1"	$300.	per	ton
1¼"	280.	"	"
1½"	260.	"	"
2"	220.	"	"
2½"	220.	"	"
3"	220.	"	"

FIVE POINT STARS

1¼"	$280.	per	ton
2"	220.	"	"
2½"	220.	"	"
3"	220.	"	"

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AGRICULTURAL ABMET BEARING METAL

QUINCY FOUNDRY INC.

QUINCY, OHIO

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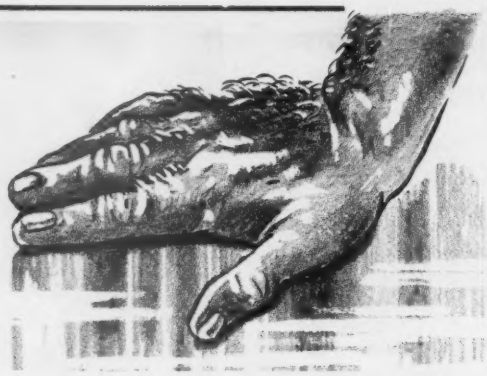

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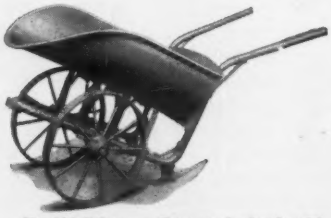
FORWARD DUMP BARROWS for FOUNDRIES

No. 102-A Barrow. Single steel wheel with 2" face, 16" diameter and 12 spokes.



No. 113-A Barrow. Two steel wheels with 2" face, 18" diameter and 10 spokes.

Here are two well-balanced charging Wheelbarrows for heavy duty foundry service. Handle loads up to 1000 lbs. Sturdy, welded, all-steel construction. Single wheel or double wheel. Available with zero pressure cushion type wheels or 4 ply pneumatic tired wheels with roller bearings. Immediate shipment.

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Sterling FOUNDRY EQUIPMENT

STERLING WHEELBARROW COMPANY • MILWAUKEE 14, WIS., U. S. A.

A 5 2-⅛

room loaded with boxes and containers with hidden labels or no labels at all. This point should be checked each time a new container is placed in the storeroom.

10. *Keep old stock to the front; use it up first.* The practice of using from a section and then stacking the new arrivals in front of the remainder of old stock seldom is good procedure, even when arrival of new stock requires complete rearrangement of the old.

11. *Standardize such equipment as shelving, bins, etc.* Standardization facilitates rearrangement for changing conditions and arrival of entirely new items and also lends itself to easier maintenance and upkeep of equipment.

12. *Provide for future needs.* Make certain that storage bins, shelves, etc., lend themselves to easy expansion if necessary, and have proper strength and high salvage value.

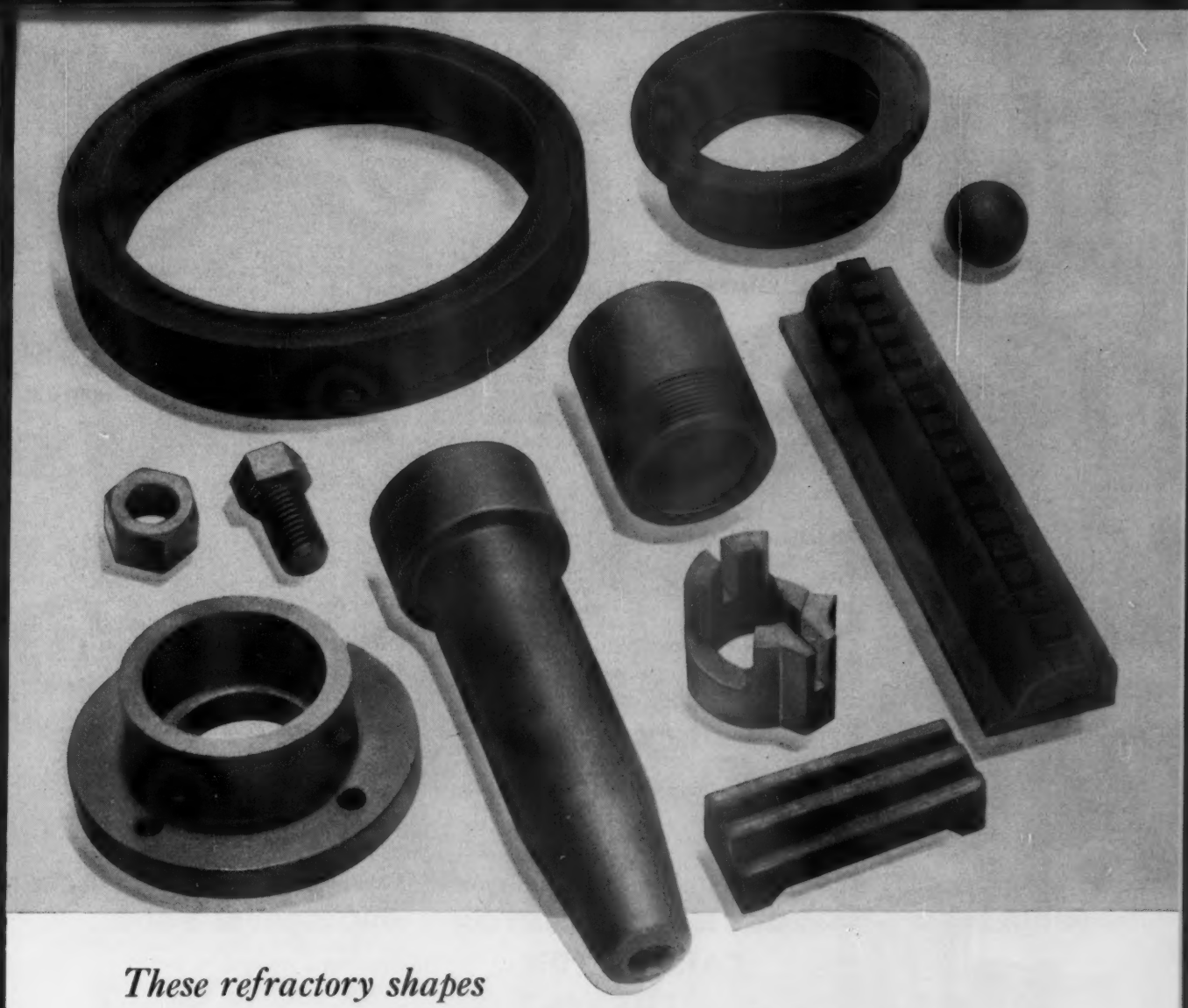
13. *Take safety precautions.* This applies not only to storage in such a manner as to eliminate collapse of piles, but also to elimination of any possible physical injury to employees when they are handling stored goods.

14. *Watch out for fire.* Every fire insurance company has information on proper storage for its policyholders, and many companies have individual practices which must be followed if insurance coverage it to be obtained. Have the local agent check your storage procedures and facilities regularly.

15. *Guard against vermin.* Good housekeeping is the best practice. Seal all cracks in walls, floor, and ceiling and eliminate damp conditions in the storeroom.

16. *Keep goods off floors and away from walls and ceilings, if possible.* Runners for floor storage

"My husband is ill so I came down to take his place."



These refractory shapes

stay strong up to 3000°F —are not wet by aluminum

REFRAX® silicon-nitride-bonded silicon carbide refractory looks like a metal, can be formed into shapes formerly possible *only* with metals—yet gives results far superior to most metals. Non-wetting by molten aluminum, for example, prolongs refractory life because dross can't penetrate or adhere. And processes like die casting and aluminizing, which used to operate intermittently because some parts corroded, can now be run continuously.

Iron nozzles for handling molten aluminum are an example. The aluminum causes them to cut out in an hour, or even less. But REFRAX nozzles in the same application often last for as long as *several hundred* hours.

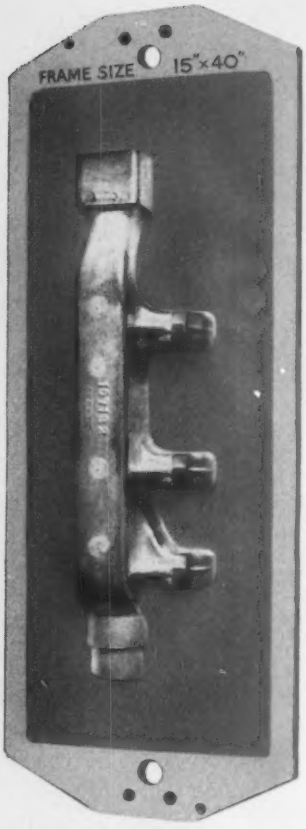
REFRAX parts are not affected by most acids, even corrosive slags and highly-reactive materials. They're also highly resistant to abrasion and heat shock—and retain virtually all of their properties up to, and occasionally beyond, 3000°F.

If you work with aluminum holding or alloying furnaces, (including reverberatory and induction), or could use these properties for other applications, it will pay you to write for complete information from: Refractories Division, The Carborundum Company, Perth Amboy, New Jersey. Please address: Department C-58.

CARBORUNDUM

Registered Trade Mark

Circle 768 on Page 51



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This Drier pattern for a diesel engine manifold is made from an original master pattern. *Only one shrinkage!* Material is "Ni-resist" iron. Pattern was used for 500 pieces. Only 3 hours labor and 44 pounds of TAMASTONE were required. Up to 1,000 castings have been made from a plate of this type!

No special skill needed to increase production 400% or more! . . . WRITE . . .

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Circle 769 on Page 51

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JOHNSTON EQUIPMENT
For the FOUNDRY
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- Heating Torches
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- Heat Treating Furnaces
- Burners, Blowers, Controls

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JOHNSTON CAR BOTTOM FURNACES
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. . . has tripled our annealing capacity. We particularly like its mechanical features—the Fluid-drive unit for the car, the automatic, power-operated door, and the one push button firing. The mechanical seals are a tremendous improvement over the old sand seals.

On the basis of our experience we recommend it highly."

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Plant Superintendent
MINNEAPOLIS ELECTRIC
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are inexpensive and easily made.

17. *Keep aisles wide enough.* Attempting to secure more storage space by squeezing aisles between stacks generally is bad procedure.

18. *Provide an area for unpacking, inspection, and temporary storage.* This move helps in the reduction of waste disposal problems in other parts of the building and facilitates checking of goods before they are removed from storage.

19. *Provide fire-fighting apparatus.* If a sprinkler system is not feasible, fire extinguishers should be available from any part of the storeroom.

20. *Watch the housekeeping.* Closed metal containers should be available for all combustible material. Goods subject to rust and corrosion should be stored in a dry place and in some cases should be given a protective coating. Goods easily damaged always should be stored in containers — preferably those in which they were shipped from suppliers.

Hoist Manufacturers Elect

At the annual meeting of the Hoist Manufacturers Association, Washington, held at the Waldorf Astoria Hotel, New York, all officers and directors were re-elected. Arland R. Walkley, Manning, Maxwell & Moore Inc., Muskegon, Mich., will serve again as president; Milton L. Aitken, Robbins & Myers Inc., Springfield, Ohio, was re-elected vice president; and Joseph H. Peritz continues as executive secretary-treasurer.

Directors for the 1958 term are Carl O. Hedner, Yale & Towne Mfg. Co., Philadelphia; William C. Miles, American Engineering Co., Philadelphia; and William S. Armington, Euclid Crane & Hoist Co., Cleveland.

Cocker Co. Holds Open House

Annual dinner of the Cocker Machine & Foundry Co., formerly of Gastonia, N. C., was held at its new plant, recently completed in nearby Ranlo. Employees and their families were welcomed to the open house and dinner by John Cocker III, president-general manager of the company. John C. Bodansky, vice president-treasurer, distributed pins to 10 and 15-year veteran employees. Gene Pittman, office manager, had charge of arrangements for the plant opening. Founded 44 years ago, the entire Cocker industries are now combined on a central location.

Circle 770 on Page 51

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Circle 771 on Page 51

Foundry Group Meetings

West Coast— First annual AFS District 5 Regional Conclave was held at the Hotel Claremont, Berkeley, Calif., on Feb. 8. Chapter officers from the Southern California, Northern California, Oregon, Washington, and British Columbia chapters were present to dicuss programs of the various foundry groups for 1958 and 1959 and to acquaint members with the extensive Training and Research Institute courses being presented by the society.

John R. Russo, regional vice president of District 5 (Russo Foundry Equipment Co., Oakland, Calif.) presided, with comments presented by S. C. Massari, AFS technical director, and Ralph E. Betterley, AFS education and training director. —*J. M. Snyder.*

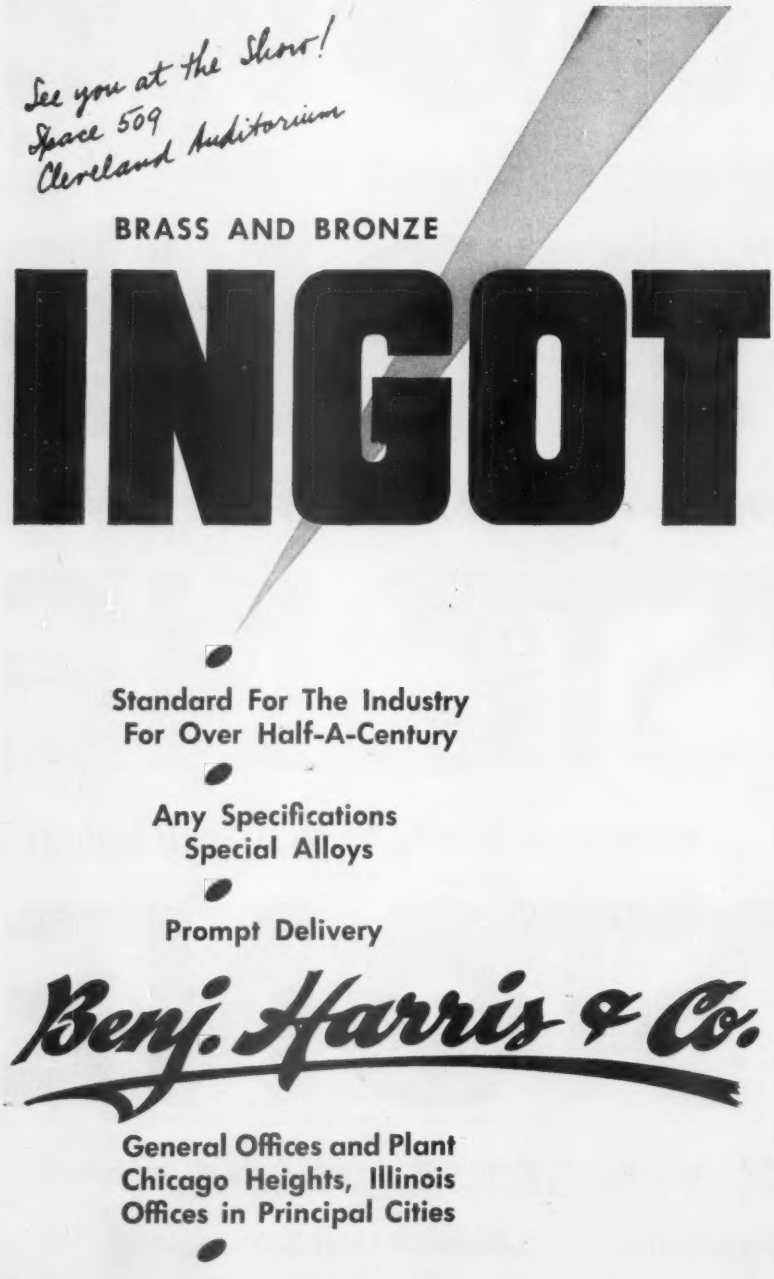
Philadelphia—The AFS chapter held its regular monthly meeting Feb. 14 at the Engineers Club, Philadelphia, with about 100 persons in attendance. S. T. Walters, Air Reduction Sales Co., New York, discussed general standards and specifications applicable to welding methods. Lowell Palmer, president, American Metaseal Co., West New York, N. J., spoke on what foundrymen should know about casting impregnation.

A discussion of "Safety for Foundrymen" attracted 100 AFS members and guests to the March 14 meeting. Speaker was Richard R. Wily, Bethlehem Steel Co., Bethlehem, Pa., who discussed the subject from the aspect of what constitutes a good, basic program. He illustrated safety equipment and practices in use at the Bethlehem Steel Co., covering all phases of foundry practice.

Special guest at the meeting was national AFS director A. A. Hochrein, American Smelting & Refining Co., Baltimore.—*Edward C. Klank, Philadelphia Coke Co.*

Metropolitan— March meeting of the AFS chapter was opened by Howard E. Voit, Sterling Wheelbarrow Co., chapter chairman, who read an article from the Newark *News* commenting on the proposed City of Newark, N. J., smoke abatement ordinance. John O'Neil was quoted as saying that the proposed new code would be so regulatory that iron foundries could not exist under it and that all iron foundries presently in Newark would be put out of business.

Technical chairman H. Yeager, American Brake Shoe Co., introduced Oscar Kastens, sales manager, Newaygo Engineering Co., featured speaker at the meeting. Mr. Kastens presented the first showing of a film, "Small Foundry Mechanization." He first defined a small foundry as one with 70 employees or less, and stressed the need for cooperation within the group. Small foundries, of course, need to be engineered to the required amount of mechanization. The film then illustrated a number of foundries



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Marietta concrete silos in any capacity, any number of units, are quickly erected at low cost. Interlocking concrete stave construction surrounded by sturdy reinforcing rods assures safe, dry storage that will resist wind, shock or fire and requires a minimum of maintenance. The extra strength factor built into Marietta concrete Storage Silos makes it possible to mount heavy mechanical or pneumatic equipment on top or on side walls.

Design flexibility permits addition of storage or handling facilities at any time.

Marietta engineers will be glad to analyze your particular storage problem and work out the most economical solution. Send for a copy of the Marietta Industrial Storage Systems Booklet today.

Special Foundry Storage and Core Sand Handling Problems Easily Solved. Write, Wire or Call.

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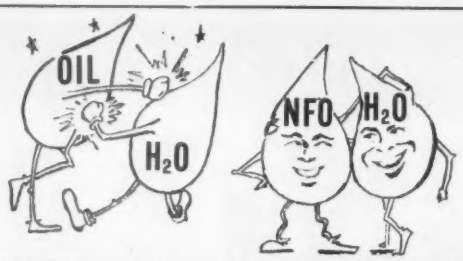

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For these reasons your *new* pneumatic tools will in all probability have been test run and rust proofed with NON-FLUID OIL, because most pneumatic tool manufacturers use "NR" Grades for initial lubrication.

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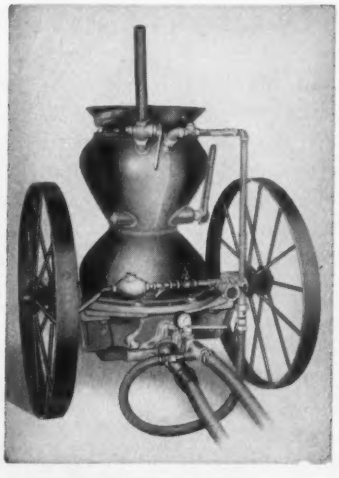
Circle 758 on Page 51

PATCH AND PLACE UP TO 5000 LBS. OF REFRACTORY MATERIAL AN HOUR WITH THE

"CEMENT GUN"®



Your own men can learn to operate the "CEMENT GUN" quickly and easily. After that, two or three of them can make all your cupola and ladle repairs in quick time. Using the "CEMENT GUN," they can place a lining 1" to 6" thick in one continuous operation, placing as much as 5000 lbs. of refractory material an hour. Write today for special FREE bulletin describing the "CEMENT GUN," its operation, prices, etc.

CEMENT GUN COMPANY
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Circle 759 on Page 51

with varying degrees of mechanization such as sand handling and conditioning, centralized pouring, centralized shakeout, and mechanized flask return.

Mr. Kastens pointed to this country's expanding economy to emphasize the necessity for mechanization to meet the challenge of better working conditions and decreased costs.—*C. H. Fetzer, International Nickel Co.*

Northeastern Ohio— Approximately 200 members and guests attended the March 13 meeting of the AFS chapter held jointly with the Cleveland Chapter, Non-Ferrous Founders' Society, at Tudor Arms Hotel.

Walter E. Sicha, chief, Cleveland Research Division, Aluminum Co. of America, discussed "Production of Sound Castings" as related more particularly to aluminum-base alloys. The most common difficulty with those alloys is the presence of porosity which results from different causes. Corrective procedures can be applied only when the source of porosity is known.

Mr. Sicha described several types of porosity and showed slides of typical examples. He also suggested ways to reduce or eliminate the defects. In concluding his talk he pointed out that application of process knowledge presently available, instead of waiting for new techniques, will lead to production of sound castings.

The names of the new officers nominated by the Northeastern Ohio Chapter of AFS for 1958-59 were announced at the April 9 meeting of the group.

Nominees include Emil J. Romans, National Malleable & Steel Castings Co., chairman; A. H. Hinton, Aluminum Co. of America, first vice chairman; N. J. Stickney, Sand Products Corp., second vice chairman; H. A. Strater, North American Refractories Co., treasurer; and H. E. Heyl, Federal Foundry Supply Div., Archer-Daniels-Midland Co., secretary.

Directors nominated for three-year terms are Henry Apthorp, East Ohio Gas Co.; George Luekens, Hickman, Williams & Co.; D. C. Hartman, Cove Pattern Works; C. J. Jelinek, Ford Cleveland Foundry, and O. W. Street, Parker-Street Castings Co.

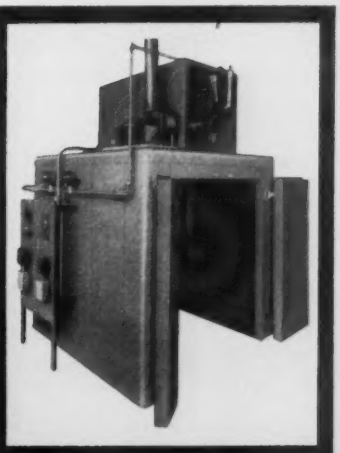
Edwin J. Walcher, American Steel Foundries, Chicago, spoke on "Building a Modern Foundry Organization." Usually it is best to start with an intelligently drawn

Foundry Products and Production Rates Dictate Oven Requirements

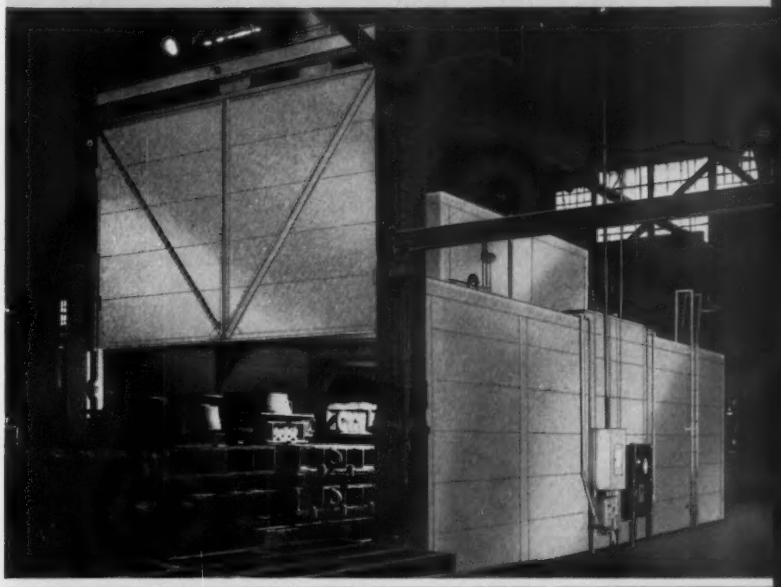
LANLY can meet any and all of yours

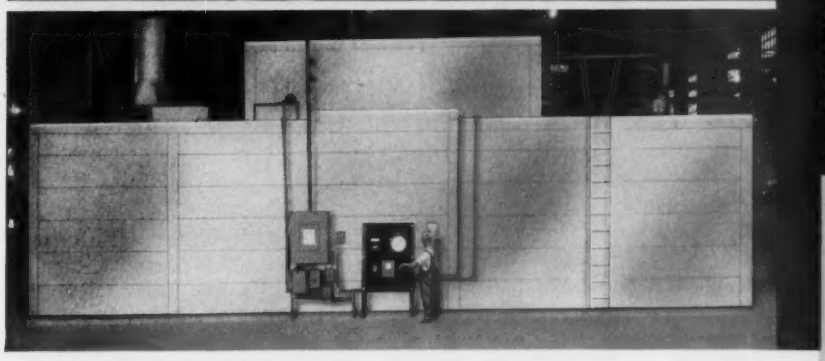
- from Small RACK TYPE OVENS

generally used when the baking of smaller cores is required in the production operation of your foundry.



-to Gigantic CAR TYPE OVENS





when the drying of large molds and cores for bigger castings is required.

This huge installation in the foundry of a large supplier of railroad products efficiently and economically carries its share of the load in the production of better castings.

Consult LANLY for a proposal on foundry ovens before you buy. A check of your present equipment may disclose a fuel eater, a core spoiler or a heat loser amongst them.

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THE lanly CO.
FOUNDRY OVENS
780 Prospect Ave. • Cleveland, Ohio

Circle 760 on Page 51

Bucyrus-Erie Co. installs ARCAIR—saves time in Clean-up of Castings

Bucyrus-Erie Co. has installed Arcair for foundry cleaning room operations at its Erie (Pa.) Works.

With three conditioning booths equipped with Arcair torches, considerable time is being saved in casting clean-up—removal of riser stubs, flash, inclusions and defects. And operators learned the process easily and quickly.

You too can save with Arcair! Basic simplicity—electric arc plus ordinary compressed air—makes Arcair the new, efficient, cost-cutting answer to your metal removing problems.

Send today for full information!

Arcair Metal Removal Torches

465 S. Mt. Pleasant St., Lancaster, Ohio

Circle 777 on Page 51

PSC's All-Sheet Construction Adds to Furnace Tube Life

Experience of users shows much lower frequency of burn-out, with tube life extended up to 100%. In PSC tubes, precision-welded bends are of same metal and thickness as the legs. The continuously smooth walls result in uniform flow of gas, and reduce the carbon build-up and bend burn-out, which commonly result from the rough interiors of cast alloy bends. Lighter than cast by 33 to 50%, PSC radiant tubes cost less initially. Any size, shape or alloy.

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THE PRESSED STEEL CO. • Wilkes-Barre, Pa.

organization chart to illustrate the desired arrangement. Then an inventory and appraisal is made of individuals now filling the various positions, and suitable adjustments made accordingly.

A successful operation requires teamwork of all departments since the failure of any one to do its proper share nullifies the efforts of all the others. Effort of the team is concentrated on meeting pre-established goals, and the measuring stick is attainment of satisfactory returns on the investment over a period of years. Flexibility of the team to cope with any future developments or change is important. —*Edwin Bremer*

Chicago Gray Iron— The Chicago Area Management Executives Group of the Gray Iron Founders' Society held its quarterly luncheon meeting at the Graemere Hotel, Feb. 18, with E. Harold Mitchell, the society's field director, Cleveland, as the guest speaker.

W. P. Wright, assistant sales manager and production manager, Hansell-Elcock Co., and chairman of the group, presided at the meeting.

Mr. Mitchell discussed the marketing statistics on gray iron castings which the society compiles and how they can be interpreted with specific pertinence to the Chicago area. He also sought to ascertain what further marketing statistics the group has need for and to determine how the national office can obtain the information and make it available.—*Erle F. Ross.*

St. Louis: Feb. 13 meeting of the AFS chapter had John R. Nieman, Shell Process Inc., Park Forest, Ill., as speaker on the subject of "Shell Molding in a Production Jobbing Foundry." Among the items covered by Mr. Nieman were types of shell mold patterns, tolerances that can be held consistently, resin selection, and kind and fineness of sands applicable to the process.—*H. V. Boemer, Great Lakes Carbon Corp.*

Wisconsin— At the March meeting of the AFS chatper, held at Hotel Schroeder, Milwaukee, five foundry subjects were discussed at separate meetings following dinner.

For the gray iron group, William D. Chadwick, Manley Sand Co., Rockton, Ill., described installation of sheet metal cones in circular return-sand storage bins. The cones have proved advantageous in many respects. In the installation he dis-

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Circle 779 on Page 51

scribed sand temperature became more uniform, ranging from 140 to 180° F. with an average variation between consecutive batches of only 10 degrees. Moisture control was more uniform. Without the cones in place, sand had a tendency to build up on the sides of the storage bin, thereby decreasing the active storage space of the bins, and with the cones in place the sand system capacity has been increased. Square bins could be modified similarly with pyramids.

J. W. Gitzen, Delta Oil Products Corp., Milwaukee, talked on "Core Hardness and Core Surfaces" before a group of nonferrous foundrymen.

The steel group had as its speaker Robert Bergmann, Falk Corp., Milwaukee. His topic was "Fundamentals of the Heat Treatment of Steel."

"Material Handling in the Foundry" was discussed by Fred Pampel, Chain Belt Co., Milwaukee, at the malleable iron session.

J. L. Miler, Wisconsin Industrial Commission, spoke at the pattern-making session on "General Trades Apprentice Problems." — *John E. Hubel.*

New England— The March 12 meeting of the AFS chapter was held at the University Club, Boston, with approximately 125 in attendance. Lewis W. Greenslade, foundry superintendent, Brown & Sharpe Mfg. Co., gave an interesting talk on gating and risering. He reviewed many ways of applying gates and risers and showed slides of some of the practices used at the Brown & Sharpe foundry.—*F. S. Holway, Mystic Iron Works.*

Twin City— Patternmakers turned out en masse with foundrymen to learn about "Epoxy Plastics for Patternmaking" at the March 11 meeting of the AFS chapter. M. K. Young, assistant products manager, U. S. Gypsum Co., Chicago, was the speaker. Using slides as illustrations, he explained numerous applications for plastics in making patterns and tooling. He stated that many patternmakers are now doing what tool and die makers formerly did, particularly in the automotive industry.

Harry Blumenthall, membership committee chairman, reported the chapter's target of 225 members had been surpassed and welcomed the new members present at the meeting.—*Walter Ducat, Ducat Pattern Works; David Johnson, J. David Johnson Co.*

Washington— There were 63 members and guests at the March 20 meeting of the AFS chapter at the Engineers' Club, Seattle, to hear O. Jay Myers, vice president of the Foundry Div., Reichhold Chemicals Inc., discuss "Rosin or Resin."

Mr. Myers covered the variety of binders used in foundry operations, breaking them down for discussion purposes into inorganic and organic binders. He outlined the position proteins, cereals, oils, and resins play in the binder field. Foundrymen will be hearing more about alkyds in the near future, according to the speaker. Alkyds hold great promise in future technological development as core binder material which will give the foundryman better performance at lower costs.

The winners in the chapter's Robert E. Kennedy Memorial Apprentice Contest were determined from the 21 entries submitted by local apprentices. The Puget Sound Naval Shipyard entries won first place in all three molding divisions. Winners in each division are:

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Iron Molding Division: David L. Haynes, Puget Sound Naval Shipyard, first place; Gaile D. Canfield, Atlas Foundry & Machine Co., and Antonio DiIorio, Washington Iron Works, tied for second and third.

Steel Molding Division: Dennis M. Jenniges, Puget Sound Naval Shipyard, first place; James Fazio, Atlas Foundry & Machine Co., second place; Robert T. Lyons, Washington Iron Works, and Naaman Peterson, Puget Sound Naval Shipyard, tied for third place.

Nonferrous Molding: Wayne J. Bernhard, Puget Sound Naval Shipyard, first place; Roy McElroy, Sunset Foundry, second place; Bob Lemke, Peterson Pattern Works, third place.

Wood Patternmaking: Ronald Aldridge, Eagle Pattern Works, first place; Ralph S. Busacker, Puget Sound Naval Shipyards, second place; Donald B. Boot, Morel Foundry, third place. Handsome bronze plaques on which the winner's name was engraved were awarded first-place winners in each division.

February meeting was held at the Engineer's Club in Seattle, Feb. 20, with William K. Gibb, Atlas Foundry & Machine Co., as chairman.

"Exothermic and Insulating Materials in the Foundry" was the topic of the interesting talk given by Don E. Wyman, sales manager, Exomet Inc., Conneaut, Ohio.

Highly exothermic, moldable exothermic, and insulating materials are finding greater use as feeding aids in the foundry today. Mr. Wyman reported that these materials have enabled the foundry to control cleaning room costs and obtain greater yield and at the same time improve casting quality.

The speaker, talking to a mixed group of both ferrous and nonferrous foundrymen, stressed the proper use of these three foundry tools. He discussed the mechanics of metal solidification and pointed out how heat transfer problems will vary as to the metals, temperatures, and size of castings involved.—*Frank H. Jefferson.*

Toledo—Chapter officers and directors were elected for the 1958-59 season at the March meeting of this AFS chapter. Chairman is Richard E. Bossert, Maumee Malleable Castings Co.; vice chairman, Thaddeus Giszczak, Central Foundry Div., General Motors Corp., Defiance, Ohio; secretary, LeRoy F. Schultz, Freeman Supply Co.; and treasurer, Warren A. Burwell, Railroad Products Div., Wheel Department, American Brake Shoe Co.

Directors elected to serve three-year terms are Roy C. Ensign, Ensign Foundry Co.; Joseph Tillman III, Unitcast Corp.; Fred Showers, Monroe Steel Castings Co.; Paul Sharrock, Bunting Brass & Bronze Co.; and Martin J. Gruhler, Unitcast Corp.—*L. F. Schultz, Freeman Supply Co.*

Northern California—"Core Binders, Their Composition and Function," proved a most interesting subject for the March meeting of the AFS chapter held in Berkeley, Calif., at Spenger's Restaurant. The speaker was O. Jay Myers, vice president of the Foundry Div., Reichhold Chemicals Inc.

Mr. Myers gave a most enlightening talk, liberally sprinkled with blackboard explanations of the divergent properties of corebinders which have long served the foundry industry, and of certain new ones which carry unusual promise for the enterprising foundryman of today.

In view of the complexity of the subject and the time allowed, Mr.

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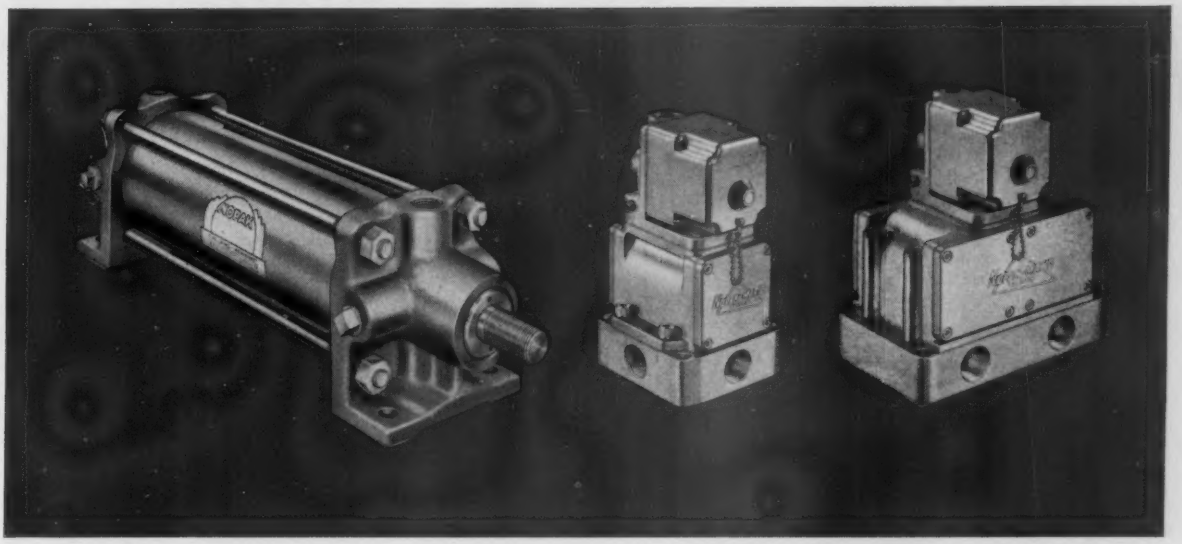

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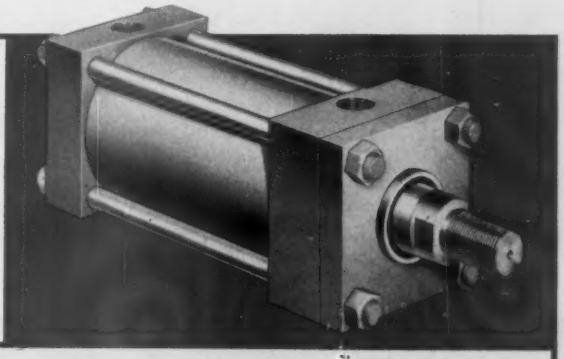

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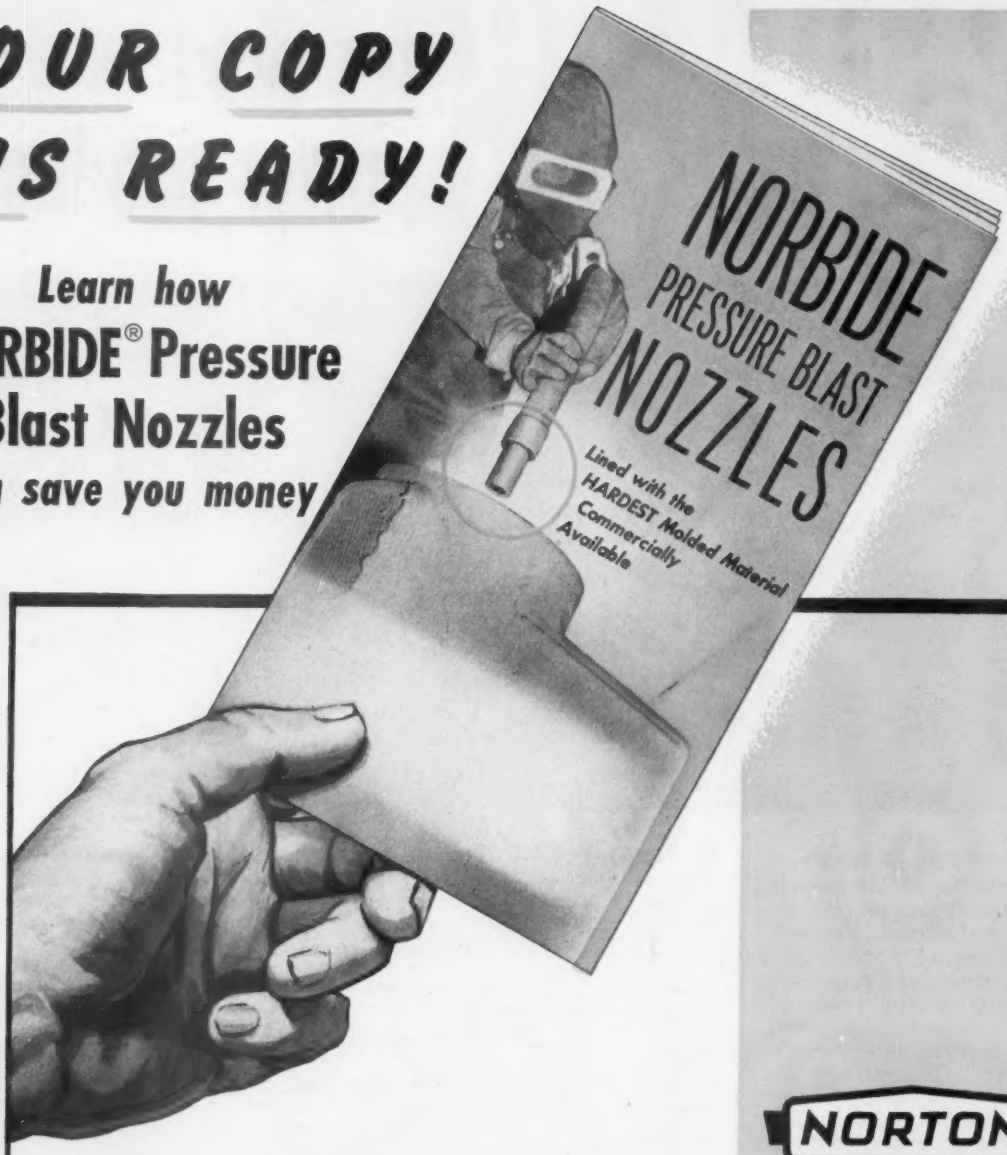

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Myers explained that his talk was little more than a synopsis which he hoped would excite the interest and encourage foundrymen to make a deeper study of these interesting and valuable corebinders.—*Harold E. Henderson, H. C. Macauley Foundry Co.*

Ontario— At the Feb. 21 meeting of the AFS chapter at the Royal Connaught Hotel, Hamilton, Ont., slides and a movie were shown on "Application of Plastics to Pattern Equipment" covering development work being done at Crowe Foundry Ltd., Hespeler, Ont. A panel consisting of B. Crowe, Crowe Foundry; Willard Jones, Canadian Westinghouse Co., Hamilton; J. Marshall, International Harvester Co., Hamilton; and J. Tierney, Hysol (Canada) Ltd., discussed questions from the audience on the use of plastics in pattern equipment.

On March 28 more than 200 members were on hand to hear Harry Kessler, manager, Sorbo-Mat Process Engineers, and president, Foundry Design Co., discuss "Molding and Melting." Mr. Kessler pointed out the advantages of good control over processes, raw materials, and melting together with metallurgy. His remarks on "steel equivalents" were most interesting. He presented a set of figures on charge makeup consisting of steel, pig, etc., and from which it is possible to calculate tensile strengths. He also gave formulas for riser dimensions, facing sand make-up, and gate cores.

Following the technical session, Mr. Kessler reverted to his favorite subject, "Boxing," and related some of his interesting personal experiences while refereeing many championship fights. A movie was shown of the Moore-Marciano championship bout, refereed by Mr. Kessler. —*P. J. Provias, International Nickel Co. of Canada Ltd.*

Saginaw Valley— Student-Teacher night attracted 250 to the AFS meeting at Fischer's Hotel, Frankenmuth, Mich., on March 6. There were 118 instructors and students from the area's senior and junior high schools present at the meeting.

Verne Sadler opened the program by outlining briefly the purposes and functions of the American Foundrymen's Society and the Foundry Educational Foundation. He then introduced Richard A. Flinn, professor of metallurgical engineering, University of Michigan, who de-

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scribed the types of students the University of Michigan is looking for and some of the phases of engineering work being carried on for postgraduate degrees.

Dr. Austen J. Smith, head of the Department of Mechanical Engineering, Michigan State University, talked on the co-functioning of industry and student.

Donald A. Bergh, instructor of metallurgy, General Motors Institute, discussed General Motors' approach to the problem of providing engineers for industry and the program at the institute.

John Lowe, chairman of the chapter's Educational Committee, introduced student speakers. Chester Mielke, University of Michigan, presented "Current Research in Pressure Tightness in Bronze Castings." He illustrated his talk with a number of excellent slides. Richard D. Smith discussed the many advantages of student summer employment in the foundry for both the student and industry. Thomas Fancher, General Motors Institute, discussed "Improved Core and Molding Methods." A question and answer period followed the talks.

On April 3 approximately 150 AFS members and guests attended the regular meeting at Fischer's Hotel, Frankenmuth. Featured speaker was Hugh A. Wichert, management, sales, and executive counsel, whose topic was "Hold Your Head High." Mr. Wichert's inspiring and interesting talk concerned the mechanics of human relations. — *R. J. Gleffe, Central Foundry Div., General Motors Corp.*

Chicago—Don G. Schmidt, metallurgist, H. Kramer & Co., is the nominee for 1958-59 president of the Chicago Chapter AFS, to succeed William O. McFatridge, supervisor of foundry laboratory, International Harvester Co. During the past year, Mr. Schmidt has served as vice president and chairman of the program committee.

Nominations for next year's officers were made at the chapter's regular meeting at the Chicago Bar Association on April 7. The nominating committee, composed of the three immediate past presidents, was headed by Robert B. Schauss, Chicago manager, Werner G. Smith Inc. It also included James T. Moore, vice president, Wells Mfg. Co., and Robert L. Doelman, sales engineer, Miller & Co.

Candidate for vice president is John C. Mullholland, foundry superintendent, Pettibone Mulliken

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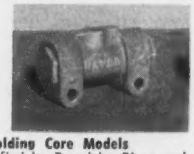

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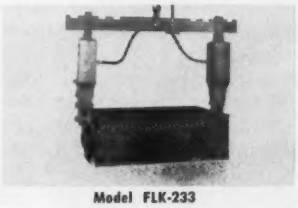

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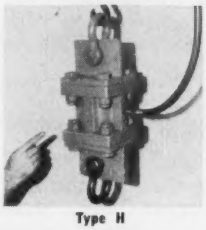

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Corp., and for secretary, R. M. Frazier, service engineer, Hickman, Williams & Co., the latter renominated for a second term.

Nominated to be directors: for one year, Jack Coffey, chief metallurgist, Hansell-Elcock Co.; for three years, Retiring President W. O. McFatridge; Henry Young, chief chemist and metallurgist, Crane Co.; and L. F. Bartosz, steel foundry superintendent, National Malleable & Steel Castings Co.

Election will be held at the chapter's final meeting of the year May 5.

Some 185 members and guests participated in four roundtable sessions making up the technical portion of the meeting program. W. D. McMillan, supervisor of metallurgy, International Harvester Co., addressed the combined Gray Iron and Malleable divisions on "Water-Cooled Cupola Operation." The Nonferrous and Pattern divisions joined to hear Marvin Glassenberg, associate metallurgist, Armour Research Foundation, speak on "Eliminating Leakage in Navy 'G' Pressure Castings."

"Refractories and Ladle Practice" was the subject for the Steel division, with Richard Ames, general supervisor, ceramic department, South Works, United States Steel Corp., as the speaker. E. W. Greenlees, master mechanic, Kensington Steel Co., discussed "Aches and Pains of Foundry Maintenance" before the Maintenance division.

The May 5 meeting will feature Lester B. Knight, president, Lester B. Knight & Associates, Chicago, who will speak on "Automation in the Foundry."—*Erle F. Ross.*

Pittsburgh— Members of the AFS chapter met March 17 at Webster Hall Hotel with David C. Ekey, School of Industrial Engineering, Georgia Institute of Technology, as speaker. He discussed the selection, location, and allocation of molding machines.

Dr. Ekey first described work functions of modern molding machines, the assignment of jobs to the machines with emphasis on standard-time data, and the layout of a typical jobbing foundry. He showed the importance of linear programming in production control of molding machines.

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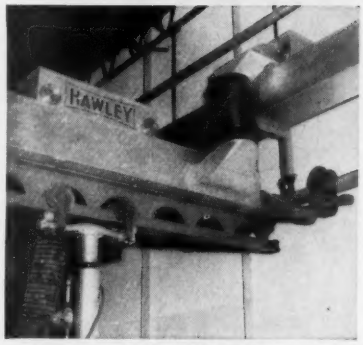
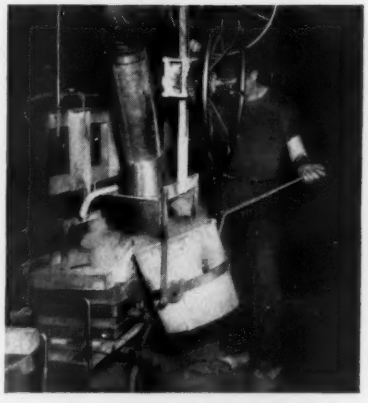


eliminates big, expensive area ventilating systems



exhausts toxic fumes at any pouring point

• *First and only* real solution to non-ferrous foundry ventilating problems. Eliminates "zinc shakes" and other health hazards . . . improves working conditions. Pays for itself in heat saved. *Installs at less* than ⅓ the cost of inefficient, conventional systems . . . uses as little as 1500 cfm. Will fit *your* foundry layout. Write now for complete information . . . to Martin Equipment Company, Box 173, Wabash, Indiana.

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Circle 791 on Page 51

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Circle 792 on Page 51

GUMMED-UP AIR TOOLS?

try this **FREE SAMPLE** of **RE-LAX-IT**

cleans and lubricates pneumatic tools without dismantling

Buffalo RE-LAX-IT Solvent is your low-cost answer to sticky valves and improper lubrication of compression chamber. It cleans as it lubricates.

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Let's hear about jobber proposition. ☐ Jobber
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Circle 793 on Page 51

essary to have new equipment to compete in this market."

The speaker described various methods of compacting sand, showing the advantages and disadvantages of each. He showed that the rising cost of labor makes mechanical handling and molding necessary. Improper machine scheduling cost a typical foundry large amounts of time, until it began proper production control.

"Foundries can save as much as 75 per cent of their production time by using the right machine. Poor scheduling costs money. Proper selection will save the cost of a new machine in time," he concluded.—*Robert Love.*

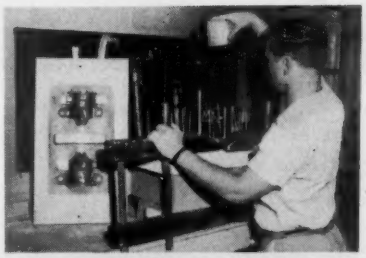
ASM Offers Home Study Course On Steel Foundry Practice

A home study course covering all phases of steel casting has been released by Metals Engineering Institute, a division of American Society for Metals, 7301 Euclid Ave., Cleveland 3. Called "Steel Foundry Practice," it was edited especially for the institute by Dr. C. W. Briggs, technical and research director, Steel Founders' Society, and covers the techniques and underlying metallurgy connected with the subject.

The course covers the following major categories: Patterns and design; molds; melting practice and steelmaking; pouring; metallurgical aspects of solidification and contraction; and finishing operations such as cleaning, heat treatment and repair welding, and inspection.

This course, like previous institute courses, is available to individuals for home study or to organizations for classroom groups for on-the-job or special in-plant training sessions.

"I wouldn't leave those candlesticks there, Mother. The hobby foundry is short on brass scrap"



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Hundreds of national manufacturers have found that PLASTIC STEEL can save them up to 75% in time — and 25% to 75% of total costs — over conventional methods of patternmaking. Tremendous savings are being made every day on all types of patternmaking and repair and alteration of patterns. The ability of PLASTIC STEEL B to reproduce extremely fine detail makes it particularly well suited for model and pattern work.

PLASTIC STEEL is also used throughout industry for making durable, accurate core boxes, forming dies, molds, jigs, holding devices; rebuilding and repairing machinery, etc.

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May 19-23

**PLASTIC STEEL is the registered trade mark for Devcon Corporation's metallic molding and filling compound.*

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Circle 794 on Page 51

Foundry Educational Foundation

1138 TERMINAL TOWER BUILDING • CLEVELAND 13, OHIO

TO THE FOUNDRY INDUSTRY:-

In these days of "Sputniks" and missiles, we hear a good deal about "crash" programs in science and engineering. These somewhat frantic proposals serve to remind us of the foundry industry's efficient and productive Foundry Educational Foundation program now in its 11th year.

The foundry industry can be proud that, through the Foundry Educational Foundation, its efforts have brought the following results:-

1. MANPOWER - Engineering employment rose 40% in the foundry industry during the period 1950-57 (overall average was 5%). Through the prudent distribution of scholarships the number of FEF students has almost tripled.

2. MARKET - Engineering students who will be castings customers and design engineers of the future are being indoctrinated with a knowledge and appreciation of cast metals. Each year, about 6000 of these students take foundry courses at FEF schools.

3. ENGINEERING FACILITIES AND FACULTIES - In addition to the manpower and market gains, the permanent additions in foundry facilities (over $2,000,000) and teaching staffs (up 400%) represent an investment of four dollars on the part of the schools for every dollar the industry has invested in the FEF.

4. CASTING TECHNOLOGY - The vast resources of facilities and brainpower at FEF schools provide a constant source of new ideas for the production of better castings at lower cost through science and engineering.

With the employment of engineers and technicians expected to rise another 30% by 1960, your FEF is expanding to meet these needs. Virginia Polytechnic Institute has just been added as our 17th school and an entirely new FEF program is being developed to produce foundry technicians to round out your engineering teams.

The Officers and Trustees want to express sincere appreciation for your support.

Very truly yours,

FOUNDRY EDUCATIONAL FOUNDATION

E J Walsh

EJWalsh/p

Executive Director

P.S. Visit A.F.S. Foundry Show, Booth 1524

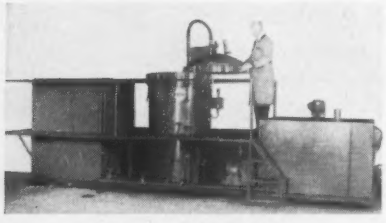
The Foundry Educational Foundation does not pay for this advertising. This space has been contributed by FOUNDRY magazine in support of FEF's constructive program for foundry industry progress through education.

PRENCO

Solves Your Impregnation Problems

Eliminate Leakers... Cut Inspection Costs

Prenco Impregnation with fast-acting, deep-penetrating PORLOX Seal eliminates microscopic porosity in ferrous and non-ferrous castings of all kinds. Let Prenco engineers provide complete analysis of your products and specific impregnation recommendations.



Buy or Lease Prenco Equipment

Prenco makes it easy for you to operate production proved impregnation equipment right in your plant. Buy it if you prefer . . . or lease it for as little as a fraction of a penny per pound of castings processed. Return the coupon below for complete information.

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Circle 796 on Page 51

Dust Hazard Lessens But Still Causes Accidents

DUST is not as great an industrial hazard today as it was earlier this century—or even 10 years ago, for that matter.

But the hazard shouldn't be ignored even at a time when most industries are doing everything possible to minimize the dust danger, most safety authorities agree.

According to E. L. Alpaugh, director of industrial hygiene for the National Safety Council, dust and other harmful substances are the culprits in about one out of very ten work accidents that result in death or permanent total disability.

The average cost per incident of such injuries, council statistics show, is nearly $14,000 in wage compensation alone. Not included in that total, of course, is human suffering and decreased production.

The dust problem, according to Alpaugh, is found in many industries—granaries, mines, even in confectionery and mannequin-making plants. Dust in industry is potentially a serious health and explosion hazard, and frequently causes eye injuries.

Preventive Measures—Solution to the problem? "Good housekeeping is one answer," Alpaugh says. "Don't allow dust to accumulate. Competent supervision and periodic cleaning are necessities, of course. Air-moving equipment such as fans should be placed so as to minimize the dispersion of dust already formed.

"Grounding machinery to remove static electricity produced in dust making and collecting is another way to lessen the danger of dust explosions."

The National Safety Council gives these additional tips for control of industrial dust:

1. Isolate dust-producing operations.
2. Substitute nondust-producing methods and materials where possible.
3. Wet dust at the source of production.
4. Provide respiratory protective devices for workers until adequate ventilation can be installed.
5. Give workers periodic physical examinations if they often are exposed to dust. Chest x-rays are necessary, too.
6. Install local exhaust systems to control dust at its source. This method is widely used in industry today and is the accepted method

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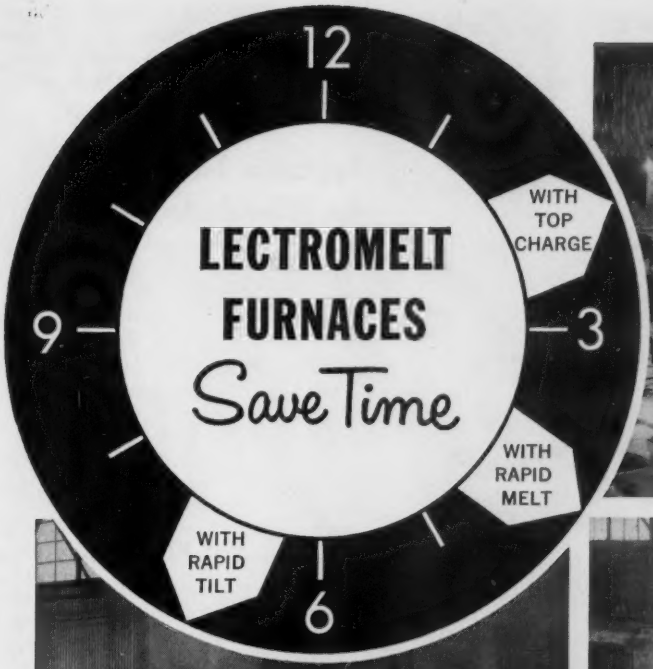
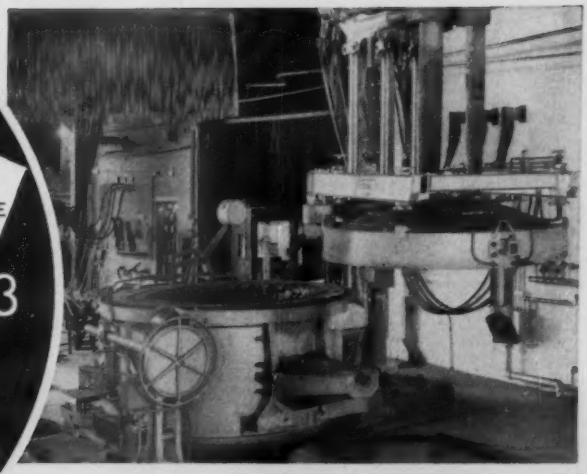
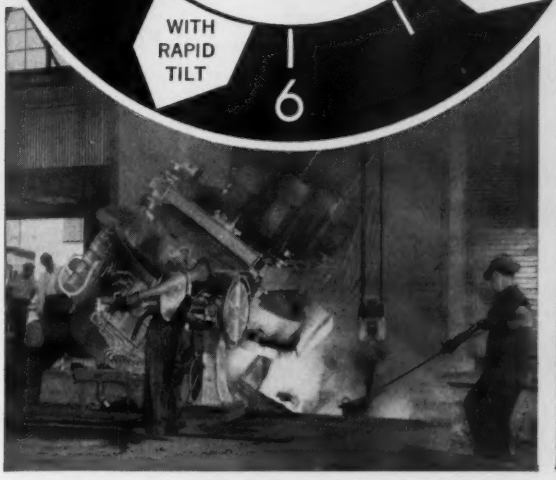
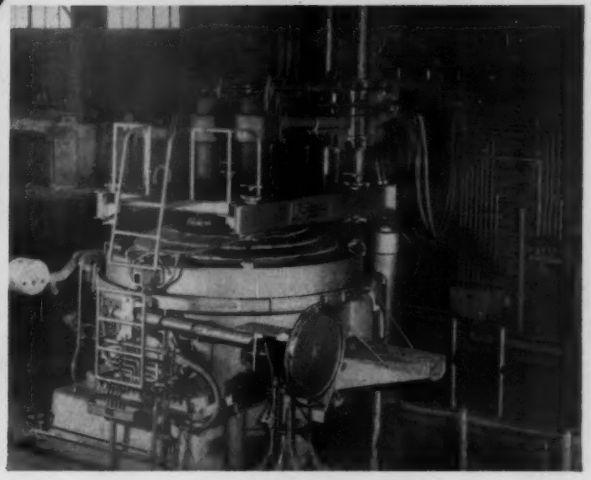
Circle 797 on Page 51









When you melt... LECTROMELT*

TOP CHARGING provides smooth, fast turn-around in furnace operation—less downtime between heats and less heat loss. Linings and electrodes last longer.

HIGH POWER INPUT allows rapid metal melting. Lectromelt makes this possible with large transformers and leads, more efficient cooling and heavier furnace construction.

RAPID TILTING is accomplished smoothly and safely. Mechanism is accurate, strong and side-mounted—located out from under, where it won't get clogged by spillage.

Catalog 10 describes Lectromelt Furnaces. For a copy, write Lectromelt Furnace Division, McGraw-Edison Company, 314 32nd Street, Pittsburgh 30, Pennsylvania.

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CANADA: Canefco Limited, Toronto . . . ARGENTINA: Master Argentina, Buenos Aires . . . ITALY: Forni Stein, Genova . . . ENGLAND: Electric Furnace Co., Ltd., Weybridge . . . GERMANY: Demag-Elektrometallurgie, GmbH, Duisburg . . . SPAIN: General Electrica Espanola, Bilbao . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Stein & Roubaix, Bressoux-Liege . . . JAPAN: Daido Steel Company, Ltd., Nagoya

STANDARD SIZES UP TO TWO HUNDRED TONS CAPACITY

new shock-absorber

chipping hammers by Ingersoll-Rand

Ingersoll-Rand has done it again—introduced a "shock-absorber" chipping hammer. Here are a few of the advantages this new concept in hammer design gives you:

- Provides new operator comfort and efficiency
- Cushions the chisel in the cut
- Absorbs chisel vibration
- Substantially reduces noise
- Eliminates maintenance due to improper operation

These new Shock-Absorber Chipping Hammers are made in 5 sizes—each with four easily converted power ranges. This means you have 20 power combinations to meet exactly the cutting need of any type of job.

Call your nearby Ingersoll-Rand AIRengineer. He will be glad to show you this revolutionary new tool, and let you test it in your own shop, on your own work. Both you and your men will prefer it. Ingersoll-Rand, 11 Broadway, New York 4, N.Y.

8-750

Ingersoll-Rand

Tools plus AIRengineering increase output per man

of control for many dust problems.

7. In the initial design of a new plant or process, give consideration to dust problems and take steps to eliminate dust sources.

Application Forms Available For Wheelabrator Fellowships

Application forms for graduate fellowship awards in foundry work now are available. They may be obtained from key faculty members at all schools in the Foundry Educational Foundation program and from key contacts at those other engineering schools which co-operated with the FEF program.

Because college graduates now employed in the foundry industry also are eligible for these fellowships, application forms also have been sent to all FEF member companies.

In addition, forms may be obtained from the FEF, 1138 Terminal Tower, Cleveland 13, Ohio. Application for awards for the 1958-59 school year should be submitted to the FEF office not later than June 1, 1958.

These awards are for $1500 each and have been made possible by a $100,000 grant to the FEF by Wheelabrator Corp., Mishawaka, Ind. A total of 50 awards will be made during the next ten years. The remainder of the grant will be devoted to other educational purposes.

Book Review

WORK SAMPLING, by Dr. Ralph M. Barnes, 283 pages, published by John Wiley & Sons Inc., 440 Fourth Ave., New York 16, N. Y. Price $7.95.

Information on the use of work sampling in industry as an effective and economical method of measurement and analysis is supplied, as well as an explanation of statistical concepts pertaining to the technique involved. The introduction provides fundamentals necessary to an understanding of work sampling, and the major portion of the book presents results of research and examples of application of work sampling methods.

Recently published studies by Dr. Barnes and his colleagues at University of California, Los Angeles, are included, as well as work contributed by many others in the field. Authoritative case studies are detailed. A snap-reading method of making time studies of machines and operatives in factory surveys is explained.

Circle 729 on Page 51

PHOTO QUIZ:

Do you know the answers to these questions on the AFS Castings Congress and Foundry Show?

1. In what location are more than 15,000 foundrymen expected to gather to see extensive exhibits and hear informative technical discussions on new foundry operating practices?

2. What are some of the interesting points that will come out in the technical sessions, say for instance at the sand sessions devoted to use of the CO_2 process for production of cores?

3. Of more than 200 extensive displays of new equipment and supplies at the AFS Foundry Show . . . which will interest you the most . . . machines . . equipment . . materials . . supplies . . or services?

4. Which developments and interesting points will be brought out in the technical papers presented, as an example, at the session on the design of plastic patterns and coreboxes?

5. What interesting castings and patterns made by apprentices will be shown, and who won the national awards in five divisions of the annual AFS Apprentice Achievement Contests?

6. What techniques will FOUNDRY magazine employ to give you detailed coverage of the Congress and Show, including technical discussions and other highlights?

The answers to these questions, plus many more facts and figures on the AFS Castings Congress and Foundry Show, May 19-23, will be specially presented in July POST-CONVENTION issue of FOUNDRY

This issue will offer a complete coverage of convention activities. A special editorial section will give you a first-hand news and photo reporting of technical papers presented; new foundry equipment and supplies; award winners; highlights of the convention . . . plus all regular editorial departments.

You'll be able to have all the answers on the Castings Congress and Foundry Show when you get a copy of the July POST-CONVENTION issue of FOUNDRY. Be assured of a complete coverage of all convention activities.

ADVERTISING FORMS FOR THIS ISSUE CLOSE JUNE 1st

FOUNDRY

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Circle 801 on Page 51

The punishing impact of cleaning and peening operations calls for a metallic abrasive that can stand up and be counted.

The Blastrite line does that and more, simply because it's produced to consistently rigid specifications.

We have a small plant but we have large ideas about quality. You get guaranteed quality when you get Blastrite shot and grit.

Write for our catalog or outline your metallic abrasive requirements to our nearest representative.

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NEW! THE Modern Air Compressor ...get the facts before you buy!

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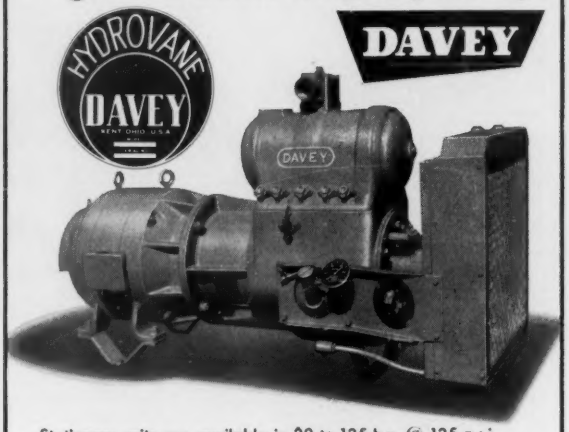

Stationary units are available in 20 to 125 h.p. @ 125 p.s.i.

- ✓ **Silent . . . vibrationless . . . compact**
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Regardless of requirement, your demands can be met with the *all new* Davey Compressor.

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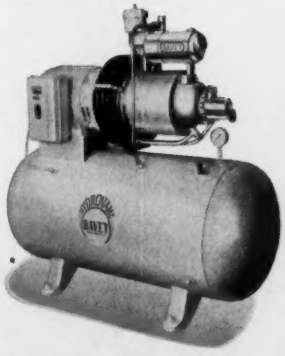
Distributors in all principal cities.

Tank-mounted rotary compressors are available in 2 to 5 h.p. @ 100-200 p.s.i.



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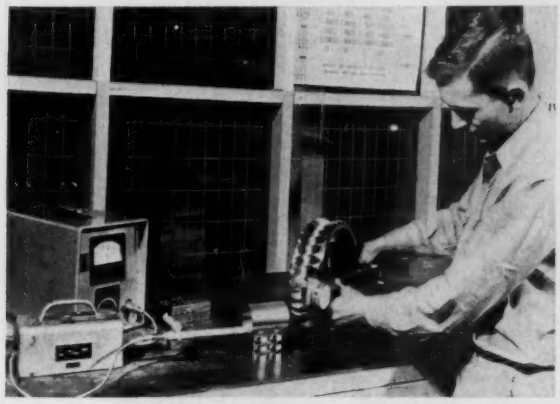
Circle 805 on Page 51

Circle 806 on Page 51

The Shakeout

Nickel-Bronze Castings Take High Stresses

NICKEL-BRONZE drumshaft bushing and worm gear castings are incorporated at the two points of greatest stress in a series of winches made by Tulsa Winch



Div., Vickers Inc., Tulsa, Okla. Stresses as high as 60,000 psi are placed on these parts at ultimate load. The worm gear is turned by a hardened and ground steel worm. Designers selected nickel-bronze and steel to reduce friction.

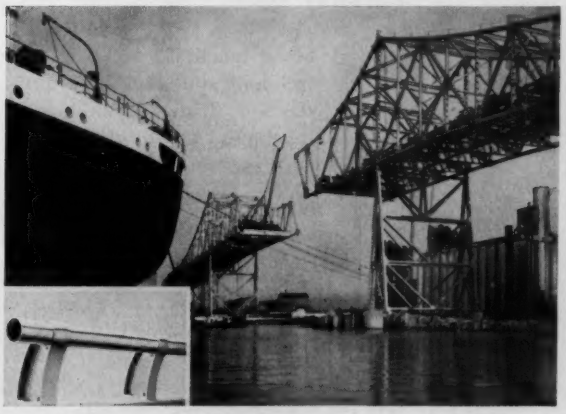
Bushings range in size from 2 to 4 in. ID; worm gears range from 5 to 18 in. OD. Both are cast in Tulsa Winch's foundry from ingot produced by Federated Metals Div., American Smelting & Refining Co., New York.

The illustration shows an inspector checking depth of cut on a gear. Profilometer in foreground measures smoothness of a bushing surface.

For More Details Circle No. 517—Page 285

6500 Aluminum Castings Support Skyway Rails

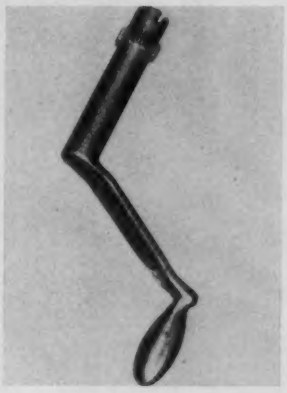
MORE THAN 10 miles of 6-in.-diam, extruded aluminum tubing for railings, supported by more than 6500 aluminum post castings, is being installed on Chi-



cago's Calumet Skyway toll road by the Aluminum Div., Michael Flynn Mfg Co., Philadelphia. Total weight of rails and posts is over ½ million lb. The post castings are spaced on approximately 7½-ft centers and are anchored to the parapet with bolts. It is reported that neither rails nor posts ever will require painting. The 7½-mile skyway is scheduled for completion early this year.

For More Details Circle No. 518—Page 285

Shell Molded Casting Replaces Fabrication



A SHELL MOLDED gray iron casting has reduced the cost of the service hand gear handle for an accounting machine by 60 to 70 per cent and at the same time greatly improved its appearance. The converted gear handle formerly was made as a screw machine part, with machined teeth, which was riveted to a forging.

The old fabrication required machining, riveting, and assembly. The shell molded casting, produced by Bennett-Ireland Inc., Norwich, N. Y., is turned out in final form except for polishing and wire brushing. Tolerances of plus 0.010 and minus 0.0 in. are maintained on the outside teeth of the part.

For More Details Circle No. 519—Page 285

Stockpiles Copper Tuyere Castings

A UNIQUE "BANK" at the Meadville, Pa., plant of National Bearing Div., American Brake Shoe Co.,

stockpiles blast furnace tuyeres. The copper castings, used as nozzles which introduce superheated air into the furnace above the hearth, perform a function similar to that of cupola tuyeres. They are stacked on pallets, ready for shipment to steel company customers. Recently, the bank came to the rescue of a steel company which suffered a breakdown of all its blast furnaces at one time when a water main burst.

For More Details Circle No. 520—Page 285

FOR STRONG, LIGHT CASTINGS
offer
FRONTIER 40-E
the Original High Strength Aluminum Alloy

Mamma's Mink, a 3-point hydroplane design, traveling at 120 m.p.h.

Frontier 40-E Aluminum Alloy Pistons in Marine Racing Engine stand up at terrific speed of 7000 r.p.m.

● Frontier 40-E Aluminum Alloy pistons, because of greater elongation factor and high tensile strength, were able to withstand the shock of this punishing service where other alloys failed.

Castings made of Frontier 40-E actually grow stronger while in use. Tests made over a period of eight years show yield strength and tensile strength continue to increase. Other benefits are: shock resistance, corrosion resistance, pressure tightness, excellent machinability.

Frontier 40-E Aluminum Alloy is not a new, unproven metal. It is backed by more than 25 years of formulating "know-how". When you recommend castings of 40-E, you are building customer satisfaction.

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Exclusive Foreign Producers of 40-E
Duralum Castings Ltd., Darlington, England
Paul Bergsoe & Son, Glostrup, Denmark L'Aluminum Francais, Paris, France

No. 4 DAYTON RING VALVE BENCH RAMMER

MORE POWER—MORE SPEED

You'll get more production with these faster, more powerful rammers and at the same time substantially reduce maintenance costs.

The Valve Units will last for years. The Cylinder Bores and Piston Rods are HARD CHROME PLATED which doubles the life of the Rammer. Many of the largest foundries in the country have already adopted them as standard. Made in six sizes to meet every requirement.

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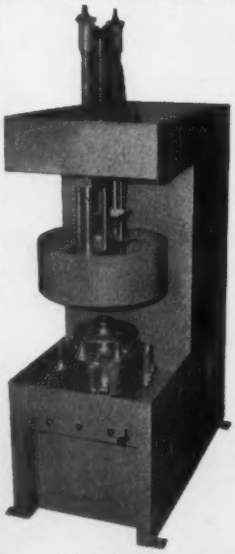
DAYTON PNEUMATIC TOOL CO.
Manufacturers of Pneumatic Tools Since 1903
DAYTON, OHIO

Circle 808 on Page 51

CENTRIFUGAL CASTING MACHINES . . . WITH STANDARD PARTS AND EQUIPMENT CAN BE . . . CUSTOM BUILT



We make machines capable of producing castings weighing MANY TONS as well as machines to produce castings weighing a FEW OUNCES.

●

Some machines are designed for long-run repetitive production, while other special machines are most suitable for short runs of varying sizes and types of castings.

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WE FURNISH INFORMATION ON HOW TO MAKE CENTRIFUGAL CASTINGS

INQUIRIES INVITED

INVESTIGATE THE POSSIBILITIES OF MAKING YOUR CASTINGS CENTRIFUGALLY . . . TODAY.

CENTRIFUGAL CASTING MACHINE CO.
P. O. BOX 947 TULSA 1, OKLAHOMA

Circle 807 on Page 51

Circle 809 on Page 51

Drop in, rest your aching feet, and get the facts on the

LATEST DEVELOPMENTS IN DIAMOND'S PRODUCTS for the FOUNDRY INDUSTRY

We've got some new and exciting products and processes to tell you about, like . . .

Silicate CO_2 process for cores, molds, ladle linings.

Alkalies for desulphurization.

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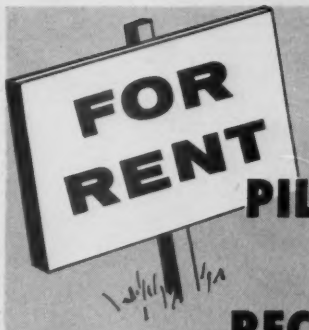
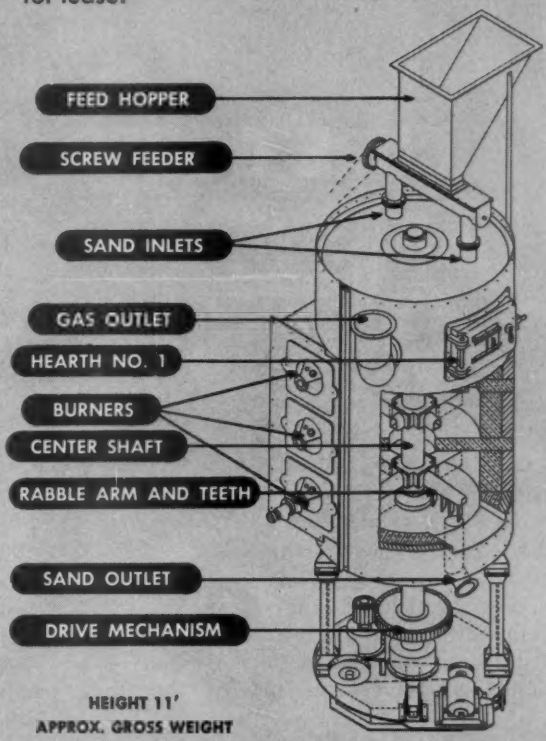


PILOT PLANT SAND RECLAMATION EQUIPMENT

The only way to judge the value of sand reclamation to *your* foundry is by actual "in-your-own-plant" testing. Nichols now offers you, at no capital investment, the opportunity to prove the advantages, in terms of dollars and cents savings, of sand reclamation. A Nichols pilot plant unit is now available for lease.



HEIGHT 11'
APPROX. GROSS WEIGHT 6000 LBS.

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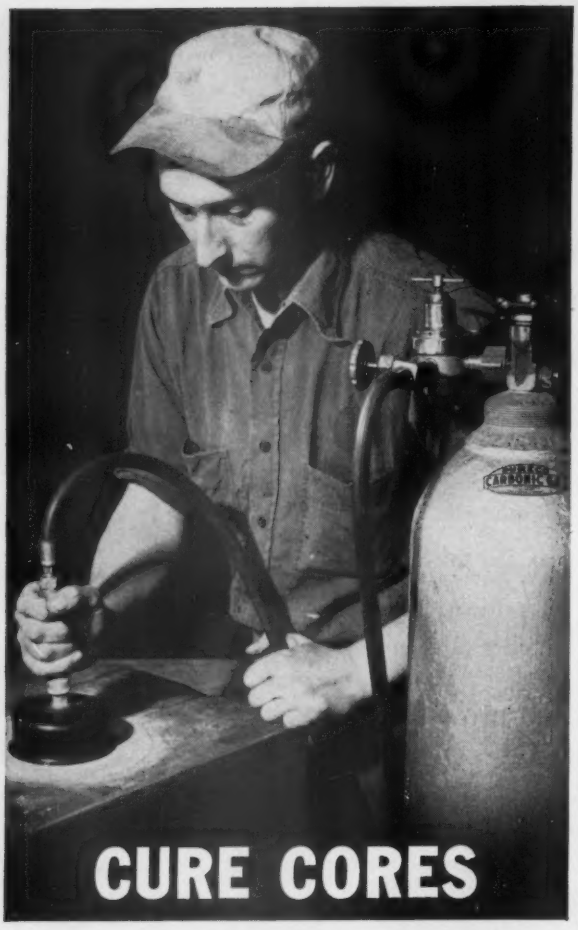
Circle 810 on Page 51

Circle 811 on Page 51



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IN SECONDS— USE PURECO CO_2

Use Pureco Carbon Dioxide to cure *large or small* cores and molds.

You eliminate costly oven equipment and operation — save cost of driers — save on core handling time — save on storage space, since cores set in seconds and can be used immediately. You cut down rejects.

Your Pureco representative will be glad to arrange for a demonstration of the CO_2 process in your plant or supply you with further information at no cost or obligation to you.

Contact your nearest Pure Carbonic office today or write the address below requesting Bulletin #27.

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Visit Our Booth #319A at the Foundry Show

Pure Carbonic Company

A Division of Air Reduction Company, Incorporated

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AT THE FRONTIERS OF PROGRESS YOU'LL FIND AN AIR REDUCTION PRODUCT

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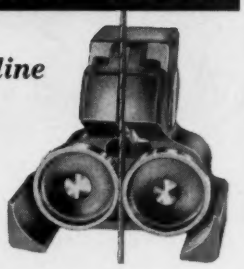
CARTER BAND SAW GUIDES

world's largest, most complete line

- For Any Saw
- Any Speed
- Any Load
- Any Purpose



New Guidall "400" Series

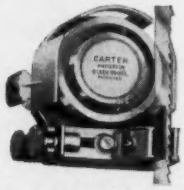
NEW GUIDALL "400" SERIES with bearings rotating on inner race for 167% greater efficiency. Higher speeds and heavier loads than ever possible before.

FAMOUS MICRO-PRECISION GUIDE SERIES require only one set of support blocks for maximum support. Sizes to fit any saw.

NEW ZEFYR BALL BEARING GUIDE WHEEL fits all standard #1 and #0 guides. Has honed, perfectly balanced raceways. Higher speeds, heavier loads, longer life.

NEW BRONZITE Micro-Precision Guide made entirely of non-ferrous materials — cannot spark or rust.

NEW UNIVERSAL MOUNTING BRACKETS for Carter Guides on any machine.



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CARTER PRODUCTS COMPANY, Inc.

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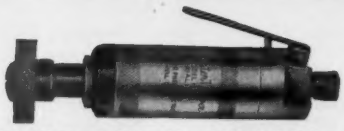
Master Power

HARD CHROMED • PORTABLE PNEUMATIC TOOLS



DO MORE WORK AT LESS COST

because they deliver more power per cubic foot of air consumed, are light in weight for easier maneuverability and they retain their new tool power longer.

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because they are lighter in weight, better balanced and designed to reduce shock and be free from vibration.

IF YOUR PROBLEM INCLUDES

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NEW BIN LEVEL INDICATOR

New ROTO-BIN-DICATOR®

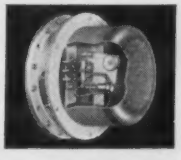
Motor driven paddle-type bin level indicator

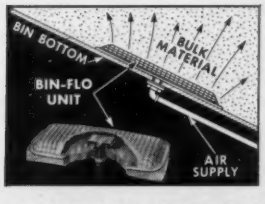
For automatic bin level indication or control of bulk materials. Particularly suited to applications on bins subject to pressure or vacuum.

EXPLOSION-PROOF
U. L. listed units available

BIN-DICATOR®

The original diaphragm-type bin level indicator. In successful use for 20 years.





BIN-FLO®

Assures gravity flow of pulverized materials

Bin-Flo Aerator units in bins, chutes, etc., use small volume, low pressure air to restore flow to dry, pulverized materials which tend to pack and bridge in storage.

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NOW! ***A Disc Wheel with a***

"THRO-A-WAY HUB"

7", 8", & 9" WHEELS. These wheels are available in 7", 8", and 9" diameters, and in 1/8, 3/16, 1/4 and 3/8" thicknesses, with the hubs bonded right on!

IT'S REVOLUTIONARY! WHY? Because the wheel adapter is built right into the wheel itself!

IT SAVES because assembly and disassembly is 200% faster.

IT SAVES because purchasing records and stock room records for wheel adapters are eliminated.

IT SAVES because the "THRO-A-WAY HUB" is priced at the depressed center level which doesn't include the adapter assembly.

IT SAVES because it eliminates Disc Wheel adapters for 5/8-11 spindles.

GEO. H. BULLARD CO., INC.
WESTBORO, MASSACHUSETTS

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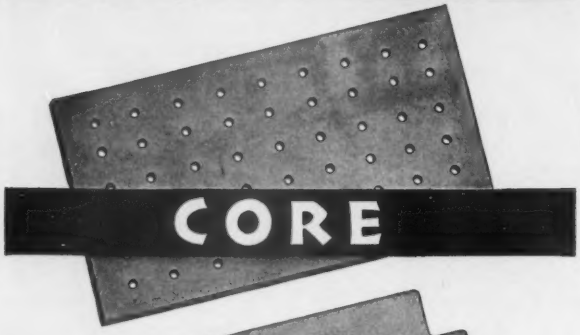
MOLTRUP



CORE

PATTERN

& BOTTOM

PLATES

for accurate casting results specify Moltrup Plates! They *stay flat* and *last longer* than other types—for Moltrup employs a special flattening process designed to permanently eliminate buckling or bending.

Consequently your investment goes further and that *all-important profit-margin* increases. Plates are made to your specifications—we welcome the opportunity to furnish complete information.

MOLTRUP STEEL PRODUCTS COMPANY

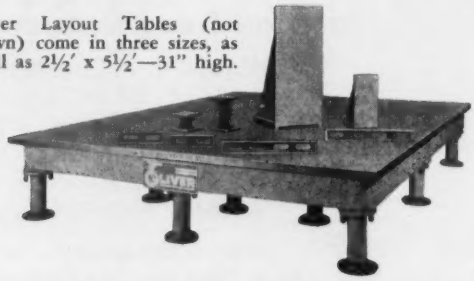
BEAVER FALLS, PA. (Pittsburgh District)

Sales Offices in All Principal Cities

MOLTRUP

New...OLIVER Layout Plates and Tables . . . the surest way to insure accuracy and save money

Oliver Layout Tables (not shown) come in three sizes, as small as 2½′ x 5½′—31" high.



In pattern shops, or wherever accurate production work is essential, the safest way to insure accuracy, expedite work and save money is to use a Layout Plate or Table. There is no substitute. The Layout Plate shown is 9′x12′—9½" thick. It is stress-relieved to prevent warping. Guaranteed flat within .005" overall, and within .002" per section. Machined edges simplify clamping. Smaller and larger size Plates with various accessories are available. If your work calls for precision, a Layout Plate or Table is the most important investment you can make. Write for full details.

Oliver makes a complete line of Pattern Lathes and Millers and woodworking machines for pattern shops. Investigate.

OLIVER MACHINERY COMPANY
Grand Rapids 2, Michigan

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SAVE TIME AND MONEY

TEX-VENT

FLEXIBLE TEXTILE CORE VENT

New Venting Material For Irregular Shaped Channels In Sand Cores

Disintegrates completely . . . leaves no residue. No sealing around core vent. Will not reduce permeability of core. Reduces porosity in castings, shortens finishing time, fewer rejects. Reduces core baking time. Allows unrestricted use of cold setting processes.

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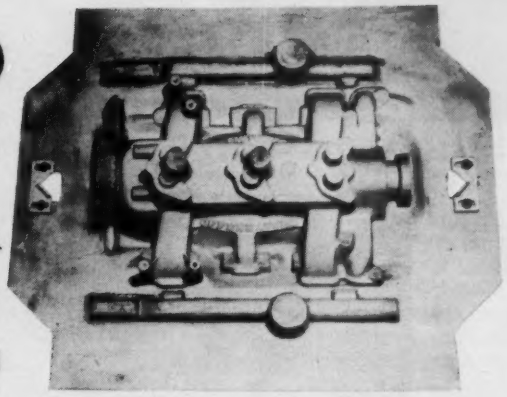
Circle 820 on Page 51

EPOCAST®

TECHNIQUES FOR PLASTICS PATTERNS



Furane Plastics, Incorporated has developed materials and techinques for duplicating existing pattern equipment which have minimized time and cost for many Plastic Pattern shops.

Furane offers satisfactory results through the use of Furane materials and services provided by a staff of qualified tooling engineers. An excellent example of results in the foundry field is shown by this intricate match plate fabricated of EPOCAST tooling plastics. For further information on the techniques of Plastics tooling, write for Furane's "PRIMER ON PLASTICS TOOLING."

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American Foundry Show

We are looking forward to meeting you and discussing your particular tooling problems at the 1958 A.F.S. Foundry Show in Cleveland, May 19-23, Booth 624.

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GLUTRIN
LIQUID BINDER

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For

CORE WORK, SAND FACINGS, SPRAYS

Write for pamphlets giving detailed information. Both materials carried in stock by America's foremost foundry jobbers

Robeson Process Company
(Established 1905)

American Gum Products Co.
(Established 1915)

GENERAL OFFICES AND PLANT: • ERIE, PA.

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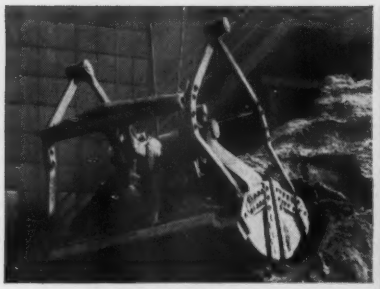
Blaw-Knox single line type buckets improve foundry handling operations



Unusually low headroom requirements are provided for by the application of symmetrically designed, extremely low headroom types of single line buckets.

Normal headroom usually accommodates standard Blaw-Knox Foundry Buckets of either the open head or closed head types.

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Blaw-Knox sales engineers can study your requirements and apply the bucket best suited to your needs.

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Blaw-Knox Equipment Division
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BLAW-KNOX

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$395
No. 2 Lab. Model
Capacity 100 lbs.

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CUTS MIXING TIME 50% • MINIMIZES AIR HARDENING
NO HEATING • NO CRUSHING • NO BALLING • EASILY CLEANED
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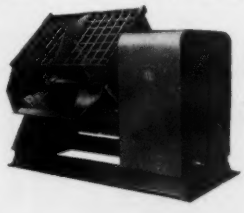

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2673

Forces blackening into pores and pockets of molds. Sprays Silica wash, oil, or water equally well. Use it also to sand blast or as a blow gun.

Standard of the foundry field for over 50 years. Stocked by leading foundry supply houses. Guaranteed by . . .

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One of the oldest producers in the Midwest

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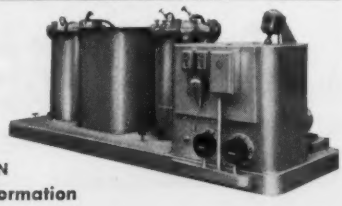
PRODUCTION IMPREGNATION CUTS TEST COSTS: ELIMINATE DOUBLE PRESSURE TESTING with IMPREX

"Twin 92", dual autoclave. Get complete penetration of sand or die pressure castings of any metal—coarse or micro-porous.



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HEAT-REM

H-170

HIGH HEAT RESISTANT PAINT

Protects Hot Surfaces

WITHSTANDS TEMPERATURES TO 1700°F.

HEAT-REM H-170 stays on where other paints burn off. Its silicone base fuses with surface metal to form an attractive, protective metal coating. It contracts and expands with temperature changes . . . prevents rust and corrosion of hot metal surfaces.

- Aluminum, gold, red and blue
- For brush or spray use, indoors or out
- Recommended for stacks, boilers, steam lines, mufflers, radiators, exhaust manifolds, piping, ovens, compressors, condensers . . . all metal surfaces subjected to high heat AA-8291

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SPECO, Inc.
"REM" PRODUCTS

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A coating of DURA-STIX will work wonders!

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120 LIBERTY STREET • NEW YORK 6, N. Y.

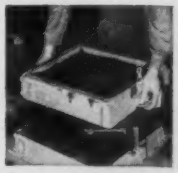
Circle 829 on Page 51

How to improve your aluminum, magnesium castings with B&A® Alkali Fluoborates

and Potassium Titanium Fluoride

In aluminum casting, use B&A Potassium Fluoborate as a purifying flux for removal of oxides. It is an excellent degassing agent, forms a dry dross, and improves fluidity of the molten metal.

Subsequent treatment with Potassium Titanium Fluoride, or a mixture of Potassium Titanium Fluoride with Potassium Fluoborate (for lower melting temperatures), produces a better grain structure in the metal. Improved grain refinement gives increased tensile strength, greater elongation, better machinability, etc.



In magnesium casting, use the B&A Alkali Fluoborates as oxidation inhibitors with both green sand and core sand. They help reduce rejects . . . cores are easier to make, faster to collapse, easier to shake out.

For further information, write or call your nearest B&A office. Ask for technical data on the use of B&A Ammonium Fluoborate, Potassium Fluoborate and Sodium Fluoborate in the light metals industry.

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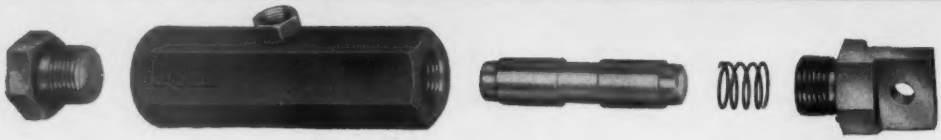

3 steel alloys*

Give Branford vibrators longer life

Strength and durability are built in . . . preserved . . . through specific steel alloys that give each part of each Branford Vibrator the properties it needs for a long serviceable life.

Branford Pistons are built from hard, chrome-coated steel, especially wear resistant to maintain efficient precision over long periods of use.

Springs made from high tensile, flexible steel flex themselves millions of times without fracture . . . without fatigue.

Branford body steel is rugged, tough, ready to take the torture and stress of vibration without breaks, cracks, and without frictional wear.

When you specify "Branford Vibrators" you receive unmatched performance, longer service, less down time.

Write for your Branford catalog and the name of your local Branford distributor.

*** Branford Vibrators are built in every size—and in every size they are built from steel throughout (including the bodies).**

THE BRANFORD COMPANY 130 CHESTNUT STREET — NEW HAVEN, CONNECTICUT

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Some of the Many Foundries utilizing Euclid Cranes . . .

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This 10-ton, 3 motor EUCLID CRANE is in operation at TEXAS ELECTRIC STEEL CASTING COMPANY

are FAVORITES in FOUNDRIES

EUCLID thinks, designs and builds foundry cranes with dust proof mechanisms that withstand abrasive, corrosive conditions.

Push-button, rope pendant floor control and overhead cab operation incorporate the latest design improvements for precise load control at all times.

EUCLID SERIES H HOISTS are available in capacities up to 10 tons.

Write for Latest Literature

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SAVE $5,000 TO $10,000 A YEAR!

Send for "Case History". Tells how a Typical Gray Iron Foundry with floors for 20 molders saved $8,300.00 in a year on sand preparation with a Self-Propelled, Self-Loading,

RINGLIFT SAND CONDITIONER

No obligation. No solicitation unless requested.

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Circle 834 on Page 51

REDUCE CASTING LOSSES
WITH
BURR ALUMINUM BOTTOM BOARDS

- Eliminates cracked molds and swells
- Won't twist, warp, swell, burn or break
- Light weight—one piece
- Rigidly bridged for strength
- Rolled edges—no splinters
- Properly vented
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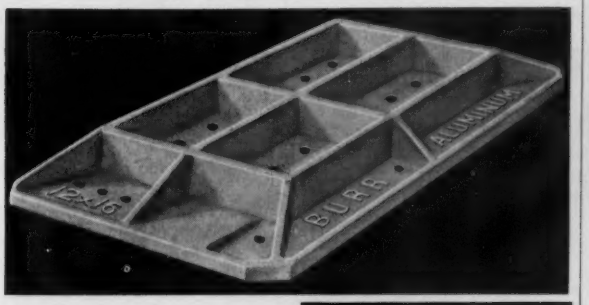

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REPLACE THESE PROFIT STEALERS!

Write for prices and sample

BURR ALUMINUM PRODUCTS

P. O. BOX 61 BURR OAK, MICHIGAN

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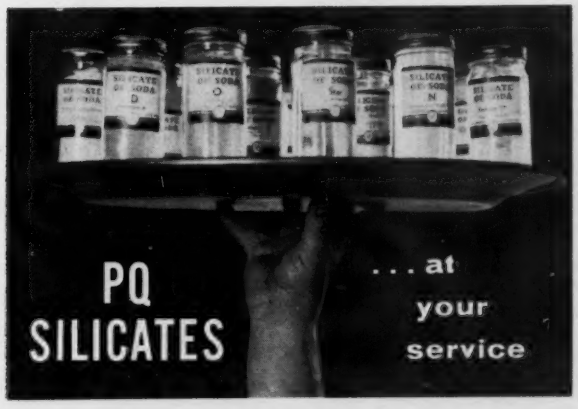
Circle 835 on Page 51



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PQ SOLUBLE SILICATES

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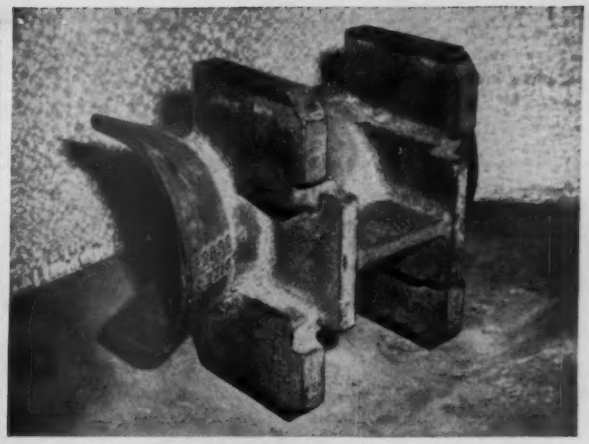

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A mistake in the pattern — and a 300-lb. casting was 1/2" too narrow in total width.

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First, the short projections were ground down. Then three layers of Ni-Rod electrode were laid on — *with no preheat required.*

The final step: easy machining to the correct over-all width of 22" plus 0.000", minus 0.032".

When you repair defective castings with Ni-Rod electrode, you get sound, machinable welds easily. Ni-Rod electrode has another important advantage: *welds match the color of the cast metal closely.*

Ni-Rod and Ni-Rod "55"* electrodes (for heavier sections) simplify repairs, make cast iron welding easier. You can order them from your supplier in 5-lb. containers — 3/32-, 1/8-, 5/32-, and 3/16-inch diameters.

Do it today. And write for your copy of "Repair Cast Iron Parts Quickly and Easily." This folder shows many ways others are saving money by salvaging and repairing cast iron with Ni-Rod and Ni-Rod "55" electrodes.

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Circle 837 on Page 51

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Stevens, Frederic B., Inc., Detroit 16, Mich.
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Cities Service Oil Co., 20 N. Wacker Dr., Chicago 6, Ill.
Delta Oil Products Co., Milwaukee 9, Wis.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Frederic B. Stevens, Inc., Detroit 16, Mich.
Thiem Products Co., 9800 West Rogers, Milwaukee 14, Wis.

CORE BINDERS (Pitch)

Penn-Rilton Co., 324 West 23rd St., New York 11, N. Y.
Frederic B. Stevens, Inc., Detroit 16, Mich.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

CORE BINDERS (Resin)

Acme Resin Corp., Forest Park, Ill.
Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Bakelite Corp., 420 Lexington Ave., New York 17, N. Y.
Delta Oil Products Co., Milwaukee 9, Wis.
Durez Plastics Div., Hooker Electrochemical Co., 1011 Walck Rd., North Tonawanda, New York.
General Electric Co., Chemical Materials Dept., 1 Plastics Ave., Pittsfield, Mass.
Hercules Powder Co., Wilmington 99, Del.
Plastics Engineering Co., Sheboygan, Wis.
Reichhold Chemical Co., 525 North Broadway, White Plains, New York.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

CORE BINDERS (Sodium Silicate)

Cardox Corp., 307 North Michigan Ave., Chicago 1, Ill.
Carver Foundry Products Co., Muscatine, Iowa.
Delta Oil Products Co., Milwaukee 9, Wis.
Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, Ohio.
Eastern Clay Products Dept., International Mineral & Chemical Corp., 20 N. Wacker Drive, Chicago 6, Ill.
E. I. Du Pont de Nemours & Co. Inc., Wilmington 98, Del.
Foundry Services, Inc., 1045 South High St., Columbus 6, Ohio.
Philadelphia Quartz Co., 1062 Public Ledger Bldg., Philadelphia 6, Pa.
Frederic B. Stevens, Inc., Detroit 16, Mich.

CORE BLOWER BUSHINGS

Eastern Clay Products Dept., International Minerals & Chemical Corp., 20 N. Wacker Drive, Chicago 6, Ill.

CORE BLOWING MACHINES

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Beardsley & Piper Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Champion Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Carver Foundry Products Co., Muscatine, Iowa.
Wm. Demmler & Bros., Kewanee, Ill.
International Molding Machine Co., LaGrange Park, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.

COREBOXES

Accurate Match Plate Co., 1847 W. Carroll St., Chicago, Ill.

CORE DRAWING MACHINES

Archer-Daniels-Midland Co., Federal Foundry Supply Division, 2191 West 110th St., Cleveland 2, Ohio.
Beardsley & Piper Div. Pettibone-Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Greenlee Bros. & Co., 2136 Twelfth St., Rockford, Ill.

CORE DRIERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

CORE GRINDERS (Power Operated)

Sutter Products Co., Hadley & Grant Sts., Holly, Mich.

CORE KNOCKOUT MACHINES

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York 17, N. Y.
Pangborn Corp., Hagerstown, Md.

COREMAKING MACHINES

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Beardsley & Piper Div., Pettibone-Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Carver Foundry Products Co., 1056 Hershey Ave., Muscatine, Iowa.
Champion Div. Pettibone-Mulliken Corp., Holly, Mich.
Davenport Machine & Foundry Co., Davenport, Iowa.
Wm. Demmler & Bros., Kewanee, Ill.
Foundry Equipment Ltd. Leighton Buzzard, Bedfordshire England
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Johnston & Jennings Div. Pettibone-Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.
Sutter Products Co., Hadley & Grant Sts., Holly, Mich.
Tabor Mfg. Co., Div. Turbo Machine Co., Lansdale, Pa.
Wadsworth Equipment Co., 2477 Magadore Rd., Akron, Ohio.

CORE OILS—See CORE BINDERS

CORE and MOLD OVENS

Carl Mayer Corp., 20800 Center Ridge Rd., Cleveland 16, Ohio.
Carver Foundry Products Co., 1056 Hershey Ave., Muscatine, Iowa.
Foundries Materials Co., Coldwater, Mich.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, O.
Girdler Corp., Thermex Division, 224 E. Broadway, Louisville 2, Ky.
Kirk & Blum Mfg. Co., 3108 Forrer St., Cincinnati 9, Ohio.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
R. C. Mahon Co. 6565 Eight Mile Rd. Detroit 34, Mich.
J. O. Ross Engineering Corp., 444 Madison Ave., New York 17, N. Y.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
Stroman Furnace & Engineering, Div. of Petersen Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

CORE PASTE

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Corn Products Refining Co., 17 Battery Pl., New York 4, N. Y.
Delta Oil Products Co., Milwaukee 9, Wis.
Eastern Clay Products, Dept. International Minerals & Chemical Corp., 20 N. Wacker Drive, Chicago 6, Ill.
Foundry Services, Inc., 2000 Bruck St., Columbus 7, Ohio.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
Superior Graphite Co., 33 S. Clark St., Chicago 3, Ill.
Thiem Products Co., 9800 West Rogers, Milwaukee 14, Wis.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

CORE PLATES (Steel, Aluminum, Magnesium, Asbestos)

American Foundry Flask Co., 2745 Southwest Blvd., Kansas City, Mo.
Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Moltrup Steel Products Co., Beaver Falls, Pa.
Republic Steel Corp., 3100 E. 45th St., Cleveland 27, Ohio.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

CORE ROD STRAIGHTENING and CUTTING MACHINERY

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Wheelabrator Corp., Mishawaka, Ind.

CORE SAND—See SAND

CORE SAND MIXERS—See SAND PREPARATION EQUIPMENT

CORE STRIPPERS—See CORE DRAWING MACHINES

CORE TESTING EQUIPMENT

Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.
Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, Mich.
Claud S. Gordon Co., 3000 So. Wallace, Chicago 16, Ill.

CORE TRUCKS—See TRUCKS (Core)

CORE VENTS

Carver Foundry Products Co., 1056 Hershey Ave., Muscatine, Iowa.
Demmler, Wm., & Bros., Kewanee, Ill.
Domestic Industries, 470 W. Broad St., Columbus 23, Ohio
Smillie, C. M., & Co., 1124 Woodward Heights Blvd., Ferndale 20, Mich.

CORE and MOLD WASH

Acheson Colloids Co., Port Huron, Mich.
Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Carborundum Co., Perth Amboy, N. J.
Cities Service Oil Co., 20 N. Wacker Dr., Chicago 6, Ill.
Corn Products Refining Co., 17 Battery Pl., New York City 4
Delta Oil Products Co., Milwaukee 9, Wis.
Foundry Services, Inc., 2000 Bruck St., Columbus, Ohio.
Mullite Refractories, Shelton, Conn.
National Carbon Co., Div. Union Carbide Corp., 30 East 42nd St., New York 17, N. Y.
Pennsylvania Pulverizing Co., 140 Stanwix St., Pittsburgh 22, Pa.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Stevens, Frederic B., Inc., Detroit 26, Mich.
Superior Graphite Co., 33 S. Clark St., Chicago 3, Ill.
Thiem Products Co., 9800 West Rogers, Milwaukee 14, Wis.
United States Graphite Co., Saginaw, Mich.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

CORES (Annealing)

Pressed Steel Co. Wilkes Barre, Pa.

CORES (Strainer, Ceramic)

Louthan Corp., East Liverpool, Ohio.
Porcelain Products, Inc., Findlay, Ohio.
Universal Clay Products, Sandusky, Ohio.

COUPLINGS (Air, Hydraulic)

Chicago Pneumatic Tool Co., 6 E. 44th St., New York 17, N. Y.
C. B. Hunt & Sons Inc., Salem, Ohio.
A. Schrader's Son, 470 Vanderbilt Ave., Brooklyn 38, N. Y.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

COUPLINGS (Flexible, Shaft)

Ajax Flexible Coupling Co., Westfield, N. Y.
Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

CRANES (Bucket)

Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Gantry)

Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., 1365 Chardon Rd., Cleveland 17, Ohio.
Modern Equipment Co., Port Washington, Wis.

CRANES (Jib)

American MonoRail Co., 13104 Athens Ave., Cleveland 7, Ohio.
Chisholm-Moore Hoist Div. Columbus-McKinnon Chain Corp., Tonawanda, New York.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., 1365 Chardon Rd., Cleveland 17, Ohio.
Modern Equipment Co., Port Washington, Wis.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Monorail—Electric and Hand)

American MonoRail Co., 13104 Athens Ave., Cleveland 7, Ohio.
Chisholm-Moore Hoist Div. Columbus-McKinnon Chain Corp., Tonawanda, New York.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., 1365 Chardon Rd., Cleveland 17, Ohio.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CRANES (Self-Propelled)

Modern Equipment Co., Port Washington, Wis.
Pettibone Mulliken Corp. 4700 W. Division St., Chicago 51, Ill.

CRUCIBLES

Ajax Electrothermic Corp., Trenton, N. J.
National Carbon Co., Div. Union Carbide Corp., 30 East 42nd St.,

CRUCIBLE POURING DEVICES

Modern Equipment Co., Port Washington, Wis.

CRUSHERS (Core)

Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, Ohio.
Newaygo Engineering Co., Newaygo, Mich.
Universal Engineering Corp. Cedar Rapids, Mich.

CUPOLAS

Bartlett & Snow, C. O., Co., (Grindle Division) Cleveland 5, O.
Modern Equipment Co., Port Washington, Wis.
North State Pyrophyllite Co. Greensboro, North Carolina
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLAS (Hot Blast Equipment)

Bartlett & Snow, C. O., Co., (Grindle Division) Cleveland 5, O.
Brown Fintube Co. Elyria, Ohio
Modern Equipment Co., Port Washington, Wis.
J. O. Ross Engineering Corp., 444 Madison Ave., New York 17, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA BLOWERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bartlett & Snow, C. O., Co., (Grindle Division) Cleveland 5, O.
Spencer Turbine Co., Hartford, Conn.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CHARGING MACHINES

American MonoRail Co., 13104 Athens Ave., Cleveland 7, Ohio.
Bartlett & Snow, C. O., Co., (Grindle Division) Cleveland 5, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA CONTROL EQUIPMENT

Foxboro Company, Foxboro, Mass.

CUPOLA DUST ARRESTORS—See DUST COLLECTING, VENTILATING, EXHAUST, COOLING SYSTEMS

CUPOLA LIGHTERS

Hickman-Williams Co., Union Commerce Bldg., Cleveland 14, Ohio.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

CUPOLA LININGS—See REFRACTORIES

CUPOLA PATCHING GUNS—See REFRACTORY GUNS

CUTOFF MACHINES (Abrasive)

DoAll Co., Des Plaines, Ill.
Fox Grinders Inc., Oliver Bldg., Pittsburgh, Pa.
Tabor Mfg. Co., Div. Turbo Machine Co., Lansdale, Pa.

CUTOFF WHEELS

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Niagara Falls, N. Y.
Electro Metallurgical Co., Div. of Union Carbide Corp., 535 Fifth Ave., New York 17, N. Y.
Electro Refractories & Abrasives Corp., Vars Bldg., Buffalo 2, N. Y.
Macklin Company, Jackson, Mich.
Norton Company, Worcester 6, Mass.
Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.

CYLINDERS (Air)

Bellows Co., 230 West Market St., Akron 3, Ohio.
Galland-Henning Mfg. Co. 2753 S. 31st St. Milwaukee 7, Wis.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Corp., Des Plaines, Ill.
Miller Fluid Power Co., 2040 North Hawthorne, Melrose Park, Ill.

CYLINDERS (Hydraulic)

Galland-Henning Mfg. Co. 2753 S. 31st St. Milwaukee 7, Wis.
Hannifin Corp., Des Plaines, Ill.
Miller Fluid Power Co., 2040 North Hawthorne, Melrose Park, Ill.

DARK ROOM ACCESSORIES—See X-RAY FILM and ACCESSORIES

DEGASIFIERS and DEOXIDIZERS

Cleveland Flux Co., 1026 Main St., Cleveland 13, Ohio.
Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.
Foundry Services, Inc., 200 Bruck St., Columbus, Ohio.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.

DESIGN TESTING

Magnaflux Corp., 7300 West Lawrence Ave., Chicago 31, Ill.

DESULPHURIZERS

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio

Cleveland Flux Co., 1026 Main St., Cleveland 13, Ohio.
Columbia-Southern Chemical Corp., Div. Pittsburgh Plate Glass Co., Pittsburgh 19, Pa.
Foundry Services, Inc., 2000 Bruck St., Columbus 7, Ohio.
Hercules Powder Co., Wilmington 99, Del.
Modern Equipment Co., Port Washington, Wis.
Olin Mathieson Chemical Corp., Mathieson Bldg., Baltimore 3, Md.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

DOWEL PINS

Standard Horse Nail Corp., New Brighton, Pa.

DRILLS (Electric)

Chicago Pneumatic Tool Co., 6 E. 44th St., New York 17, N. Y.
U. S. Electrical Tool Co., 3640 Llwellyn St., Cincinnati 23, Ohio.

DRILLS (Pneumatic)

Chicago Pneumatic Tool Co., 6 E. 44th St., New York 17, N. Y.
Gardner-Denver Co., Quincy, Ill.
Schramm Inc. West Chester, Pa.

DRIVERS (Gear, Variable Speed)

Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

DRUMS (Magnetic)—See SEPARATORS (Magnetic)

DUMP HOPPERS

Kirk & Blum Mfg. Co., 3108 Forrer St., Cincinnati 9, O.

DUMP TRUCKS

Kwik-Mix Co., 3026 West Concordia, Milwaukee 16, Wis.
Tractomotive Corp., Deerfield, Ill.

DUST COLLECTING, VENTILATING, EXHAUST, COOLING SYSTEMS

American Air Filter Co., Inc., 266 Central Ave., Louisville 8, Ky.
Bartlett & Snow, C. O., Co., (Grindle Division) Cleveland 5, O.
De Vilbiss Co., 300 Phillips Ave., Toledo 1, Ohio.
Hawley Mfg. Co. 411 North Wabash Wabash, Indiana
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Kirk & Blum Mfg. Co., 3108 Forrer St., Cincinnati 9, Ohio.
Pangborn Corp., Hagerstown, Md.
Peabody Engineering Co., 232 Madison Ave., New York 16, N. Y.
J. O. Ross Engineering Corp., 444 Madison Ave., New York 17, N. Y.
Claude B. Schneible Co. P. O. Box 296 Roosevelt Park, Detroit 32, Mich.
Tabor Mfg. Co., Div. Turbo Machine Co., Lansdale, Pa.
U. S. Electrical Tool Co., 3640 Llewellyn St., Cincinnati 23, Ohio.
Wheelabrator Corp., Mishawaka, Ind.

ELECTRIC FURNACE (See Furnaces, Electric)

ELECTRODES (Graphic and Amorphous)

Great Lakes Carbon Corp., 579 Fifth Ave., New York 36, N. Y.
National Carbon Co., Div. Union Carbide Corp., 30 East 42nd St., New York 17, N. Y.

ELEVATORS (Bucket)

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Great Western Mfg. Co., Leavenworth, Kansas.
Jeffrey Mfg. Co., Columbus 16, O.
Link-Belt Co., Prudential Plaza, Chicago 1, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.
Universal Engineering Corp. Cedar Rapids, Mich.
Westover Corp., 3110 W. Fond du lac Ave., Milwaukee 10, Wis.

ELEVATORS (Pneumatic, Material Handling)

Fuller Co., Catasauqua, Pa.

ENGINEERING SERVICE (Foundry)

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Edwin S. Carman, 1643 Lee Road, Cleveland 18, Ohio.
Giffels & Vallet, Inc., Marquette Bldg., Detroit, Mich.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, Ohio.
Keystone Abrasive Wheel Co., Carnegie, Pa.
Lester B. Knight & Associates, Inc., 549 West Randolph St., Chicago 6, Ill.
Link-Belt Co., Prudential Plaza, Chicago 1, Ill.
Westover Corp., 3110 W. Fond du Lac Avenue, Milwaukee 10, Wis.

EXHAUST—See DUST COLLECTING, VENTILATING, EXHAUST, COOLING SYSTEMS

FABRICATORS (Metal)

Kirk & Blum Mfg. Co., 3108 Forrer St., Cincinnati 9, Ohio.
Modern Equipment Co., Port Washington, Wis.
Newaygo Engineering Co., Newaygo, Mich.
Penn Iron Works, Inc., Reading, Pa.

FACINGS

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Delta Oil Products Co., Milwaukee 9, Wis.
Foundry Services, Inc., 2000 Bruck St., Columbus 7, Ohio.
National Carbon Co., Div. Union Carbide Corp., 30 East 42nd St., New York 17, N. Y.
Penn-Rilton Co., 324 West 23rd St., New York 11, N. Y.
Stevens Inc., Frederic B., Detroit 16, Mich.
Superior Graphite Co., 33 S. Clark St., Chicago 3, Ill.
United States Graphite Co., Saginaw, Mich.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

FANS—See DUST COLLECTING, VENTILATING, EXHAUST, COOLING SYSTEMS

FEEDERS (Belt)

Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, Ohio.
Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

FEEDERS (Plate)

Beardsley & Piper Div. Pettibone Mulliken Corp. 2424 N. Cicero Ave., Chicago 39, Ill.

FEEDERS (Rotary)

Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, Ohio.
Fuller Company, Catasauqua, Pa.
Great Western Mfg. Co., Leavenworth, Kansas.
Link-Belt Co., Prudential Plaza, Chicago 1, Ill.
Newaygo Engineering Co., Newaygo, Mich.

FEEDERS (Vibrating)

Carrier Conveyor Corp., 211 North Jackson St., Louisville 2, Ky.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, Ohio.
Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

FERROBORON

Electro Metallurgical Co., Div. Union Carbide Corp., 535 Fifth Ave., New York 17, N. Y.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

FERROCHROME

Electro Metallurgical Co., Div. Union Carbide Corp., 535 Fifth Ave., New York 17, N. Y.
Ohio Ferro Alloys Corp., Canton 9, Ohio.
Pickands, Mather & Co., Union Commerce Bldg., Cleveland 14, Ohio.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

FERROCOLUMBIUM

Electro Metallurgical Co., Div. Union Carbide Corp., 535 Fifth Ave., New York 17, N. Y.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

FERROMANGANESE

Electro Metallurgical Co., Div. Union Carbide Corp., 535 Fifth Ave., New York 17, N. Y.
Ohio Ferro Alloys Corp., Canton 9, Ohio.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

FERROMOLYBDENUM

Climax Molybdenum Co., 500 Fifth Ave., New York 36, N. Y.

FERROPHOSPHORUS

Eastern Clay Products Dept., International Minerals & Chemical Corp., 20 N. Wacker Drive, Chicago 6, Ill.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, Ohio.

FERROSILICON

Electro Metallurgical Co., Div. Union Carbide Corp., 535 Fifth Ave., New York 17, N. Y.
Keokuk Electro Metals Co., 320 Concert St., Keokuk, Iowa.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.
Ohio Ferro Alloys Corp., Canton 9, Ohio.
Pickands, Mather & Co., Union Commerce Bldg., Cleveland 14, Ohio.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

FERROTITANIUM

Electro Metallurgical Co., Div. Union Carbide Corp., 535 Fifth Ave., New York 17, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

FERROTUNGSTEN

Electro Metallurgical Co., Div. Union Carbide Corp., 535 Fifth Ave., New York 17, N. Y.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

FERROVANADIUM

Electro Metallurgical Co., Div. Union Carbide Corp., 535 Fifth Ave., New York 17, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

FILTERS (Air)

American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
Hannifin Corp., Des Plaines, Ill.

FIRE BRICK, CLAY, SAND, STONE—See REFRACTORIES

FLASK BANDS—See BANDS (Snap Flask)

FLASK BUSHINGS, PINS and FITTINGS

Adams Co., Dubuque, Iowa.
American Foundry Flask Co., 2745 Southwest Blvd., Kansas City, Mo.
Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Foundry Flask & Equipment Co., Northville, Mich.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Republic Steel Corp., 3100 E. 45th St., Cleveland 27, Ohio.
Smillie & Co., C. M., 1124 Woodward Hgts. Blvd., Ferndale 20, Mich.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

FLASK FILLERS

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Jeffrey Mfg. Co., Columbus 16, O.

FLASK LIFT MACHINES—See PATTERN DRAW MACHINES

FLASKS (Aluminum, Magnesium)

Adams Co., Dubuque, Iowa.
Fremont Flask Co., Fremont, Ohio.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.

FLASKS (Slip)

Adams Co., Dubuque, Iowa.
Fremont Flask Co., Fremont, Ohio.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Newaygo Engineering Co., Newaygo, Mich.

FLASKS (Snap)

Adams Co., Dubuque, Iowa.
Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Fremont Flask Co., Fremont, Ohio.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Newaygo Engineering Co., Newaygo, Mich.
Stevens, Inc., Frederic B., Detroit 16, Mich.

FLASKS (Steel)

American Foundry Flask Co., 2745 Southwest Blvd., Kansas City, Mo.
Republic Steel Corp., 3100 E. 45th St., Cleveland 27, Ohio.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

FLASKS (Wood)

Adams Co., Dubuque, Iowa.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

FLOORING (Non-Slip)

Norton Co., Worcester 6, Mass.

FLUXES

Cleveland Flux Co., 1026 Main St., Cleveland 13, Ohio.
Foundry Services, Inc., 2000 Bruck St., Columbus, Ohio.
General Chemical Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, Ohio.
Olin Mathieson Chemical Corp., Mathieson Bldg., Baltimore 3, Md.
Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.
Superflux Mfg. Co., 16125 Cleophus Ave., Allen Park 10, Mich.

FLUXES (Soldering, Welding and Tinning)

Linde Co., Div. Union Carbide Corp., 420 Lexington Ave., New York 17, N. Y.

FOUNDRY ENGINEERS (See ENGINERING SERVICE)

FOUNDRY LAYOUT and METHODS (See ENGINEERING SERVICE)

FOUNDRY NAILS

Standard Horse Nail Corp., New Brighton, Pa.

FOUNDRY SUPPLY HOUSES

Combined Supply & Equipment Co., Inc., 215 Chandler St., Buffalo 7, N. Y.
Eastern Clay Products, Dept., International Minerals & Chemical Corp., 20 N. Wacker Drive, Chicago 6, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Services, Inc., 2000 Bruck St., Columbus 7, Ohio.
Stevens, Inc., Frederic B., Detroit 16, Mich.
Thiem Products Co., 9800 West Rogers, Milwaukee 14, Wis.

FURNACE BLOWERS—See BLOWERS

FURNACE LINING—See REFRACTORIES

FURNACES (Air)

Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Electric Melting)

Ajax Electrothermic Corp., Trenton, N. J.
Ajax Engineering Corp., Trenton, N. J.
American Bridge Co., Div. United States Steel Corp., 525 Wm. Penn Place, Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Inductotherm Corp., 412 Illinois Ave., Delanco, N. J.
International Foundry Supply Co., Water & Spruce Sts., Reading, Pa.
Lectromelt Furnace Co. Div. McGraw Edison Co., P.O. Box 1125, Pittsburgh, Pa.
Ohio Crankshaft Co., Tocco Division, 4620 E. 71st St., Cleveland 5, Ohio.
Swindell-Dressler, Pittsburgh, Pa.
Westinghouse Electric Corp., 2519 Wilkens Ave., Baltimore 3, Md.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Gas or Oil Fired Melting)

Campbell-Hausfeld Co., Harrison, O.
Carl Mayer Corp., 20800 Center Ridge Rd., Cleveland 16, Ohio.
Denver Fire Clay Co. 2301 Blake St., Denver 2, Colo.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
International Foundry Supply Co., Water & Spruce Sts., Reading, Pa.
Johnston Mfg. Co., Minneapolis 13, Minn.
Lanly Company, 750 Prospect Ave., Cleveland 15, Ohio.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Reda Pump Co., Bartlesville, Okla.
Stroman Furnace & Engineering Co., Div. of Petersen Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

FURNACES (Heat Treating and Annealing)

Ajax Electric Co., Inc., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Trenton, N. J.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Carl Mayer Corp., 20800 Center Ridge Rd., Cleveland 16, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Johnston Mfg. Co., Minneapolis 13, Minn.
Lanly Company, 750 Prospect Ave., Cleveland 15, Ohio.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Ohio Crankshaft Co., Tocco Division, 4620 E. 71st St., Cleveland 5, Ohio.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

GAGGERS

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Wadsworth Equipment Co., 2477 Magadore Rd., Akron, Ohio.

GAS (Oxygen, Acetylene, Carbon Dioxide, Industrial)

Foundry Services, Inc., 2000 Bruck St., Columbus 7, Ohio.
Linde Co., Div. Union Carbide Corp., 420 Lexington Ave., New York 17, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.
Pure Carbonic Div., Air Reduction Co., 150 East 42nd St., Socony-Mobil Bldg., New York 17, N. Y.

GAS BURNERS—See BURNERS

GENERATORS (Acetylene)

Linde Co., Div. Union Carbide Corp., 420 Lexington Ave., New York 17, N. Y.

GLOVES—See SAFETY CLOTHING

GOGGLES and EYE PROTECTORS

American Optical Co., Southbridge, Mass.

GRAPHITE and GRAPHITE BRIQUETS

Acheson Colloids Co., Port Huron, Mich.
Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Great Lakes Carbon Corp., 579 Fifth Ave., New York 36, N. Y.
National Carbon Co., Div. Union Carbide Corp., 30 East 42nd St., New York 17, N. Y.
Frederic B. Stevens, Inc. Detroit 16, Mich.
Superior Graphite Co. 33 S. Clark St., Chicago 3, Ill.
United States Graphite Co. Saginaw, Mich.

GRINDERS (Electric Portable)

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
U. S. Electrical Tool Co., 3640 Llewellyn St., Cincinnati 23, Ohio.

GRINDERS (Pneumatic Portable)

Airetool Mfg. Co., Springfield, Ohio.
Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div. Reed Roller Bit Co., Houston, Texas.
Master Pneumatic Tool Co., Inc., 13 Krick Rd., Bedford, Ohio.
Aro Equipment Corp. Bryan, Ohio

GRINDERS (Surface, Bench, Disc, Floor)

DoAll Co., Inc., Des Plaines, Ill.
Fox Grinders Inc., Oliver Bldg., Pittsburgh 22, Pa.
Grinding & Polishing Machinery Corp., 2530 Winthrop Ave., Indianapolis 5, Ind.
U. S. Electrical Tool Co., 3640 Llewellyn St., Cincinnati 23, Ohio.

GRINDERS (Swing Frame)

Fox Grinders, Inc., Oliver Bldg., Pittsburgh 22, Pa.
Grinding & Polishing Machinery Corp., 2530 Winthrop Ave., Indianapolis 5, Ind.
Sutter Products Co., Hadley & Grant Sts., Holly, Mich.
U. S. Electrical Tool Co., 3640 Llewellyn St., Cincinnati 23, Ohio.

GRINDING WHEELS

Atlantic Abrasive, South Braintree, Mass.
Bay State Abrasive Products Co., Westboro, Mass.
George H. Bullard Co. Westboro, Mass.
Carborundum Co., Niagara Falls, N. Y.
Cincinnati Milling Machine Co., Cincinnati 9, Ohio.
Keystone Abrasive Wheel Co Carnegie, Pa.
Macklin Co., Jackson, Mich.
Mid West Abrasive Co., Owosso, Mich.
Norton Company, Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit, Mich.
Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
United States Rubber Co., 4300 New Haven Ave., Fort Wayne 4, Ind.

GRINDING WHEEL DRESSERS

Carborundum Co., Niagara Falls, N. Y.
Desmond-Stephen Mfg. Co., Urbana, Ohio.
Norton Co., Worcester, Mass.

GRINDING WHEEL GUARDS

Carroll Pressed Metal, Inc., 131 Dewey St., Worcester, Mass.

GRINDSTONES—See GRINDING WHEELS

GRIT—See SHOT and GRIT

HAMMERS (Chipping)—See PNEUMATIC TOOLS and CHISELS

HARDNESS TESTING EQUIPMENT

Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
King Tester Corp., 440 North 13th St., Philadelphia 23, Pa.

HEAT CONTROL AND RECORDING DEVICES

Claud S. Gordon Co., 3000 So. Wallace, Chicago 16, Ill.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 14, Ohio.
Minneapolis-Honeywell Co., Wayne and Windrim Aves., Philadelphia 44, Pa.

HEATERS (High Frequency Electric)

Ajax Electrothermic Corp., Trenton, N. J.

HEATERS (Space, Unit, Oven, Water)

American Air Filter Co. Inc., Louisville 8, Ky.
Carl-Mayer Corp., 20800 Center Ridge Rd., Cleveland 16, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Lanly Co., 750 Prospect Ave., Cleveland 15, Ohio.
Lennox Industries, Inc., Marshalltown, Iowa

HELMETS (Blasting)

American Optical Co., Southbridge, Mass.
Pangborn Corp., Hagerstown, Md.
Wheelabrator Corp., Mishawaka, Ind.

HELMETS (Welding)

American Optical Co., Southbridge, Mass.

HOISTS (Air)

Aro Equipment Corp. Bryan, Ohio
Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Curtis Pneumatic Machinery Div. Curtis Mfg. Co., 1905 Kienlen Ave., St. Louis 20, Mo.
Euclid Crane & Hoist Co., 1365 Chardon Rd., Cleveland 17, Ohio.
Gardner-Denver Co., Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Miller Fluid Power Co., 2040 No. Hawthorne, Melrose Park, Ill.

HOISTS (Chain, Hand)

Bartlett & Snow, C. O., Co., 5201 Harvard Ave., Cleveland 5, Ohio.
Chisholm-Moore Hoist Div. Columbus-McKinnon Chain Corp., Tonawanda, New York.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., 1365 Chardon Rd., Cleveland 17, Ohio.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis.
Manning, Maxwell & Moore, Inc., Muskegon, Mich.
Modern Equipment Co., Port Washington, Wis.
Yale & Towne Mfg. Co., 11000 Roosevelt Blvd. Philadelphia 15, Pa.

HOISTS (Electric)

American Engineering Co. Wheatsheaf Lane & Sepviva St., Philadelphia 37, Pa.

Chisholm-Moore Hoist Div. Columbus-McKinnon Chain Corp., Tonawanda, New York.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., 1365 Chardon Rd., Cleveland 17, Ohio.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis.
Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Manning, Maxwell & Moore, Inc., Muskegon, Mich.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.
Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa.

HOISTS (Skip)

Bartlett & Snow, C. O., Co., 5201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Div., Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Gardner-Denver Co., Quincy, Ill.
Link-Belt Co., Prudential Plaza, Chicago 1, Ill.
Modern Equipment Co., Port Washington, Wis.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

HOODS (Shakeout, Pouring and Cooling)—See DUST, COLLECTING, VENTILATING, EXHAUST, COOLING SYSTEMS

HOSE (Air, Blasting, Water, Gas)

Gardner-Denver Co., Quincy, Ill.
B. F. Goodrich Co., Akron, Ohio.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Pangborn Corp., Hagerstown, Md.
Quaker Rubber Div. H. K. Porter Co., Tacony & Comly Sts., Philadelphia 24, Pa.
Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.
Schramm Inc. West Chester, Pa.

HOSE FITTINGS and REELS

A. Schrader's Son, 417 Vanderbilt Ave., Brooklyn 38, N. Y.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

HOT TOP MATERIAL—See RISER COMPOUNDS

HYDRAULIC CLEANING—See BLAST CLEANING EQUIPMENT

IMPREGNATING SYSTEMS and CASTING SEALER

Imprex Division Ideal Industries, Inc., 2023 South 60th St. Milwaukee 14, Wis.

Prenco Products, Inc.
507 East Ten Mile Rd.,
Hazel Park, Mich.

Tousey Varnish Co.
520 West 25th St.
Chicago 16, Ill.

INGOT MOLDS

Acme Foundry Co.,
Detroit 16, Mich.

Great Lakes Carbon Corp.,
579 Fifth Ave.,
New York 36, N. Y.

National Carbon Co., Div. Union Carbide Corp., 30 East 42nd St., New York 17, N. Y.

INGOTS—(See type of metal)

INOCULANTS

Carb-Rite Co.,
1815 Halsted St.,
Chicago Heights, Ill.

Carborundum Co.,
Perth Amboy, N. J.

United States Graphite Co.,
Saginaw, Mich.

Whitehead Metal Products,
303 West 10th St.,
New York 14, N. Y.

INSPECTION EQUIPMENT

Allis-Chalmers,
Milwaukee 1, Wis.

Budd Co., 2950 Roberts Ave.,
Philadelphia 29, Pa.

Dietert, Harry W., Co.,
9330 Roselawn Ave.,
Detroit 4, Mich.

Detroit Testing Machine Co.,
9390 Grinnell Ave.,
Detroit 13, Mich.

Eastman Kodak Co.,
Rochester, N. Y.

King Tester Corp.,
440 North 13th St.,
Philadelphia, Pa.

Magnaflux Corp.,
7300 West Lawrence Ave.,
Chicago 31, Ill.

Picker X-Ray Corp.,
25 S. Broadway,
White Plains, N. Y.

INSTALLATION (Foundry Equipment)

Commercial Contracting Corp.,
12160 Cloverdale, Detroit, Mich.

IRON ORE

Pickands Mather & Co.,
Union Commerce Bldg.,
Cleveland 14, Ohio.

IRON OXIDES

Delta Oil Products Co.,
Milwaukee 9, Wis.

Tamms Industries Co.,
228 No. La Salle St.,
Chicago 1, Ill.

Thiem Products Co.,
9800 West Rogers,
Milwaukee 14, Wis.

JACKETS (Mold)—See MOLD JACKETS

LABORATORY EQUIPMENT (Chemical)

Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, Mich.

Great Western Mfg. Co.,
Leavenworth, Kansas.

LABORATORY EQUIPMENT (Physical)

Beardsley & Piper Div.
Pettibone Mulliken Corp.
2424 N. Cicero Ave.,
Chicago 39, Ill.

Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, Mich.

Claud S. Gordon Co., 3000 So. Wallace, Chicago 16, Ill.

Great Western Mfg. Co.,
Leavenworth, Kansas.

National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

Norton Co., Worcester 6, Mass.

LABORATORY EQUIPMENT (Repair)

Monroe Microscope Service,
Post Office Box 656
Rochester 2, N. Y.

LADLES

Industrial Equipment Co.,
Minster, Ohio.

Modern Equipment Co.,
Port Washington, Wis.

Pettibone Mulliken Corp.
4700 W. Division St.,
Chicago 51, Ill.

Frederic B. Stevens, Inc.,
Detroit 16, Mich.

Whiting Corp.
15607 Lathrop Ave., Harvey, Ill.

LADLE LININGS—See REFRACTORIES

LEAD

Federated Metals Div., American Smelting and Refining Co.,
120 Broadway, New York 5.

Benjamin Harris & Co.,
11th & State Sts.,
Chicago Heights, Ill.

Henning Bros. & Smith Inc.,
91 Scott Ave., Brooklyn, N. Y.

LEVEL INDICATORS (Bin)

Bin Dicator Co., 13946 Kircheval, Detroit 15, Mich.

LIFT TRUCKS (See Trucks, Power Lift)

LINERS (Shot Blast Equipment)

Gates Rubber Co.,
999 South Broadway,
Denver 17, Colo.

LINSEED OIL

Archer-Daniels-Midland Co.,
Federal Foundry Supply Division.
2191 W. 110th St.,
Cleveland 2, Ohio.

Hercules Powder Co.,
Wilmington 99, Del.

LITHIUM

Lithium Corp. of America,
Rand Tower, Minneapolis, Minn.

LOADERS

Beardsley & Piper Div.
Pettibone Mulliken Corp.
2424 N. Cicero Ave.,
Chicago 39, Ill.

Clearfield Machine Co.,
Clearfield, Pa.

Modern Equipment Co.,
Port Washington, Wis.

National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

LOADERS (Front-End)

J. I. Case Co., Racine, Wis.

Clark Industrial Truck Div.
Clark Equipment Co.,
Battle Creek, Mich.

Frank G. Hough Co.,
703 Sunnyside Ave.,
Libertyville, Ill.

Hyster Co.,
2902 N.E. Clackamas St.,
Portland 8, Oregon.

Tractomotive Corp.,
Deerfield, Ill.

LUBRICANTS (Industrial)

Acheson Colloids Co.,
Port Huron, Mich.

New York & New Jersey Lubricant Co., 292 Madison Ave.,
New York 17, N. Y.

Smith Oil & Refining Co.,
1102 Kilburn Ave.,
Rockford, Ill.

United States Graphite Co.,
Saginaw, Mich.

LUBRICATING EQUIPMENT

Hannifin Corp.,
Des Plaines, Ill.

MACHINE KEYS

Standard Horse Nail Corp.,
New Brighton, Pa.

MAGNESIUM INGOTS

Christiansen Corp., 210 South Marion, Oak Park 1, Ill.

Federated Metals Division of American Smelting and Refining Co.,
120 Broadway, New York 5, N. Y.

MAGNET CONTROLLERS

Ohio Electric Mfg. Co.,
5400 Dunham Rd.,
Maple Heights, Ohio.

MAGNETIC PARTICLE TESTING

Magnaflux Corp., 7300 West Lawrence Ave., Chicago 31, Ill.

MAGNETS

Ohio Electric Mfg. Co.,
5400 Dunham Rd.,
Maple Heights, Ohio.

MANGANESE (Briquets)

Electro Metallurgical Co., Div. Union Carbide Corp.,
535 Fifth Ave.,
New York 17, N. Y.

Whitehead Metal Products,
303 West 10th St.,
New York 6, N. Y.

MATCHPLATE METAL

Federated Metals Division of American Smelting and Refining Co.,
120 Broadway, New York 5, N. Y.

MATCHPLATES

Accurate Match Plate Co., 1847 W. Carroll St., Chicago, Ill.

Champion Div., Pettibone Mulliken Corp.,
2424 N. Cicero, Chicago 39, Ill.

City Pattern Foundry & Machine Co., 1165 Harper,
Detroit 11, Mich.

Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.

Scientific Cast Products Corp.,
1388-92 E. 40th St.,
Cleveland 3, O.

MELTING POTS

Acme Foundry Co.,
Detroit 16, Mich.

METAL CLEANING—See BLAST CLEANING EQUIPMENT

METERS (Gas, Air, Water)

Illinois Testing Laboratories, Inc.,
418 N. LaSalle St.,
Chicago 10, Ill.

MIXERS (Core Wash)

Archer-Daniels-Midland Co.,
Federal Foundry Supply Division.
2191 West 110th St.,
Cleveland 2, Ohio.

MOLD CONVEYORS — See CONVEYORS (Mold)

MOLD DRYERS

Kirk & Blum Mfg. Co.,
3108 Forrer St.,
Cincinnati 9, Ohio.

Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.

MOLD JACKETS

Adams Co., Dubuque, Iowa.

Archer-Daniels-Midland Co.,
Federal Foundry Supply Div.,
2191 West 110th St.,
Cleveland 2, Ohio

Burr Aluminum Products
Burr Oak, Mich.

Chicago Mfg. & Distributing Co.,
1928 W. 46th St., Chicago 9, Ill.

Fremont Flask Co., Fremont, O.

Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.

MOLD OVENS—See CORE and MOLD OVENS

MOLD SEAL COMPOUND

Presstite Keystone Engineering Products Co.,
39th & Chouteau, St. Louis, Mo.

Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

MOLD WASH—See CORE and MOLD WASH

MOLDING MACHINES

Adams Co., Dubuque, Iowa.

Archer-Daniels-Midland Co.,
Federal Foundry Supply Div.,
2191 West 110th St.,
Cleveland 2, Ohio

Beardsley & Piper Div., Pettibone Mulliken Corp.
2424 N. Cicero, Chicago 39, Ill.

Champion Div. Pettibone Mulliken Corp.,
2424 N. Cicero, Chicago 39, Ill.

Davenport Machine & Foundry Co., Davenport, Iowa.

Eastern Clay Products Dept.
International Minerals & Chemicals Corp., 20 North Wacker Drive, Chicago 6, Ill.

Foundry Equipment Ltd.
Leighton Buzzard, Bedfordshire
England

Herman Pneumatic Machine Co.,
Union Bank Bldg.,
Pittsburgh 22, Pa.

International Molding Machine Co., LaGrange Park, Ill.

Johnston & Jennings Div.,
Pettibone Mulliken Corp.,
2424 No. Cicero Ave.,
Chicago 39, Ill.

Nichols, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.

Sutter Products Co.,
Hadley & Grant Sts.,
Holly, Mich.

Tabor Mfg. Co.,
Div. Turbo Machine Co.,
Lansdale, Pa.

MOLDING SANDS—See SAND

MOLYBDENUM and COMPOUNDS

Climax Molybdenum Co., 500 Fifth Ave., New York 36, N. Y.

Whitehead Metal Products,
303 West 10th St.,
New York 14, N. Y.

MONORAIL SYSTEMS—See CONVEYORS (Overhead Monorail)

MOTORS (Electric)

Allis-Chalmers Mfg. Co.,
Milwaukee 1, Wis.

Link-Belt Co., Prudential Plaza,
Chicago, Ill.

Ohio Electric Mfg. Co., 5400 Dunham Rd., Maple Heights, Ohio.

MULLERS—See SAND PREPARATION EQUIPMENT

NAILS (Chill)

Republic Steel Corp., 3100 E. 45th St., Cleveland 27, Ohio.

Standard Horse Nail Corp., New Brighton, Pa.

NICKEL

Alloy Metal Products, Inc., Rockingham Rd., Davenport, Iowa.

International Nickel Co., Inc., 67 Wall St., New York City 5.

Whitehead Metal Products, 303 West 10th St., New York 6, N. Y.

NITROGEN—See GAS

NOZZLES (Blasting)

Alloy Metal Abrasives Co., 121 South Division St., Ann Arbor, Mich.

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio

Carborundum Co., Perth Amboy, N. J.

Davenport Machine & Foundry Co., Davenport, Iowa.

Norton Co., Worcester 6, Mass.

Pangborn Corp., Hagerstown, Md.

Wheelabrator Corp., 505 S. Byrkit St., Mishawaka, Ind.

OIL BURNERS—See BURNERS

OPEN HEARTH DOORS

Wm. M. Bailey Co., Pittsburgh 16, Pa.

OPTICAL PYROMETERS—See PYROMETERS

OVENS (Annealing and Heat Treating)—See FURNACES (Heat Treating and Annealing)

OVENS (Core)—See CORE and MOLD OVENS

OVENS (Enameling, Japanning)

Carl Mayer Corp., 20800 Center Ridge Rd., Cleveland 16, Ohio.

Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

Kirk & Blum Mfg. Co., 3108 Forrer St., Cincinnati 9, Ohio.

Lanly Co., 750 Prospect Ave., Cleveland 15, Ohio.

R. C. Mahon Co. 6565 Eight Mile Rd. Detroit 34, Mich.

OVENS (Mold Drying)—See CORE and MOLD OVENS

OXYGEN—See GAS

PAINT (Corrosion and heat resistant)

Speco, Inc, 7308 Associate Ave., Cleveland, Ohio

PARTING COMPOUNDS

Acheson Colloids Co., Port Huron, Mich.

Archer-Daniels-Midland Co., Federal Foundry Supply Division, 2191 W. 110th St., Cleveland 2, Ohio.

Delta Oil Products Co., Milwaukee 9, Wis.

Dow Corning Corp., Midland, Mich.

Foundry Services, Inc., 2000 Bruck St., Columbus 7, Ohio.

Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.

Frederic B. Stevens, Inc., Detroit 16, Mich.

Tamms Industries Co. 228 N. LaSalle St., Chicago 1, Ill.

Thiem Products Co., 9800 West Rogers, Milwaukee 14, Wis.

Superior Graphite Co. 33 S. Clark St., Chicago 3, Ill.

Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

Witco Chemical Co., 75 East Wacker Dr., Chicago 1, Ill.

PATTERN COATINGS

Acheson Colloids Co., Port Huron, Mich.

National Chemical & Plastics Co. 1424 Philpot St., Baltimore 31, Md.

PATTERN COMPOUND

Devcon Co. Danvers, Mass.

Tamms Industries Inc., 228 N. LaSalle St., Chicago 1, Ill.

PATTERN DRAW MACHINES

The Adams Co., Dubuque, Iowa.

Beardsley & Piper Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.

Champion Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.

Davenport Machine & Foundry Co., Davenport, Iowa.

International Molding Machine Co., LaGrange Park, Ill.

Tabor Mfg. Co., Div. Turbo Machine Co. Lansdale, Pa.

PATTERN METAL

Federated Metals Division of American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

PATTERN PLATES—See PATTERNS and PATTERN PLATES (Wood, Metal, Plastic)

PATTERN SHOP EQUIPMENT

DoAll Co., Des Plaines, Ill.

Oliver Machinery Company, Grand Rapids 2, Mich.

Tamms Industries Co., 228 N. LaSalle St., Chicago 1, Ill.

PATTERNS and PATTERN PLATES (Wood, Metal, Plastic)

Accurate Match Plate Co., 1847 W. Carroll St., Chicago, Ill.

Champion Div., Pettibone Mulliken Corp. 2424 N. Cicero, Chicago 39, Ill.

City Pattern Foundry & Machine Co., 1165 Harper, Detroit 11, Mich.

Furane Plastics 4516 Brazil St. Los Angeles 39, Calif.

Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.

Moltrup Steel Products Co., Beaver Falls, Pa.

Pyle Pattern & Mfg. Co., 2636 Sanford St., Muskegon Heights, Mich.

Scientific Cast Products Corp., 1388-92 E. 40th St., Cleveland 3, O.

Southern Precision Pattern Works 4410 First Ave., North Birmingham, Ala.

Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

PERMANENT MOLDS

Centrifugal Casting Machine Co., Tulsa, Okla.

Great Lakes Carbon Corp., 579 Fifth Ave., New York 36, N. Y.

National Carbon Co., Div. Union Carbide Corp., 30 East 42nd St., New York 17, N. Y.

PHOSPHOR COPPER

Federated Metals Division of American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

Benjamin Harris & Co., 11th & State Sts., Chicago Heights, Ill.

PHOTOGRAPHIC EQUIPMENT

Eastman Kodak Co., Rochester, N. Y.

PIG CASTING MACHINES

Wm. M. Bailey Co., Pittsburgh 16, Pa.

PIG IRON

Hanna Furnace Co., Ecorse, Detroit 29, Mich.

Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, Ohio.

Keokuk Electro Metals Co., 320 Concert St., Keokuk, Iowa.

Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.

Pickands, Mather & Co., Union Commerce Bldg., Cleveland 14, Ohio.

Pittsburgh Coke & Chemical Co., Grant Building, Pittsburgh 19, Pa.

Republic Steel Corp., 3100 E. 45th St., Cleveland 27, Ohio.

Woodward Iron Co., Woodward, Ala.

PIG IRON (Silvery)

Hanna Furnace Co., Ecorse, Detroit 29, Mich.

Pickands, Mather & Co., Union Commerce Bldg., Cleveland 14, Ohio.

Keokuk Electro Metals Co., 320 Concert St., Keokuk, Iowa.

Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.

PINS (Flask)—See FLASK BUSHINGS, PINS and FITTINGS

PITCH—See COREBINDERS (Pitch)

PLASTIC (Castable & Impregnating)

Houghton Laboratories Inc., Olean, New York

PLATE FEEDERS

Beardsley & Piper Div., Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Ill.

PLUMBAGO—See GRAPHITE and GRAPHITE BRIQUETS

PNEUMATIC TOOLS and CHISELS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.

Cleco Pneumatic Tool Div. Reed Roller Bit Co., Houston, Texas.

Dayton Pneumatic Tool Co., Dayton 1, Ohio.

Gardner-Denver Co., Quincy, Ill.

Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.

Master Pneumatic Tool Co., Inc., 13 Krick Rd., Bedford, Ohio.

Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 32, Ohio.

Schramm Inc. West Chester, Pa.

POURING DEVICES

Bartlett & Snow, C. O., Co., (Grindle Division) Cleveland 5, O.

Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.

Industrial Equipment Co., Minster, Ohio.

Modern Equipment Co., Port Washington, Wis.

Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

POWER GENERATOR

Ready Power Co., 3826 Grand River Avenue, Detroit 8, Mich.

PRESSER BOARDS

Adams Co., Dubuque, Iowa.

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

PRESSURE RECORDERS

Foxboro Company, Foxboro, Mass.

PULLEYS (Magnetic)—See SEPARATORS (Magnetic)

PUMPS

Gardner-Denver Co., Quincy, Ill.

PUMPS (Dry, Vacuum)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Fuller Company, Catasauqua, Pa.

PUSH-OFF MACHINES—SEE PATTERN DRAW MACHINES

PUTTY (Foundry)

Archer-Daniels-Midland Co., Federal Foundry Supply Division, 2191 West 110th St., Cleveland 2, Ohio.

PYROMETERS

Foxboro Company, Foxboro, Mass.

Claud S. Gordon Co., 3000 So. Wallace, Chicago 16, Ill.

Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.

Marshall Co., L. H., 270 W. Lane, Columbus 14, Ohio.

Minneapolis-Honeywell Co., Wayne and Windrim Aves., Philadelphia 44, Pa.

Pyrometer Instrument Co., Bergenfield, N. J.

Tamms Industries Co., 22 N. LaSalle St., Chicago 1, Ill.

RACKS (Core Oven)

Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

Kirk & Blum Mfg. Co., 3108 Forrer St., Cincinnati 9, Ohio.

RADIOGRAPHY (Industrial)

Budd Co., 2950 Roberts Ave., Philadelphia 29, Pa.

Eastman Kodak Co., Rochester, N. Y.

REFRACTORIES (Firebrick, Fire Clay, Fire Sand, Fire Stone)

Ajax Electrothermic Corp., Trenton, N. J.

Babcock & Wilcox Co., 161 42nd St., New York 17, N. Y.

Campbell-Hausfeld Co., Harrison, O.

Carborundum Co., Niagara Falls, N. Y.

Carborundum Co., Perth Amboy, N. J.

Cedar Heights Clay Co., Oak Hill, Ohio.

Cement Gun Co., 1520 Walnut St., Allentown, Pa.

Davis Fire Brick Co., Oak Hill, Ohio

Denver Fire Clay Co. 2301 Blake St., Denver 2, Colo.

Eastern Clay Products Dept., International Minerals & Chemical Corp., 20 N. Wacker Dr., Chicago 6, Ill.

General Refractories Co., 1520 Locust St., Philadelphia 2, Pa.

Great Lakes Carbon Co., 579 Fifth Ave., New York 36, N. Y.

A. P. Green Fire Brick Co., Mexico, Missouri.

Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.

Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, Ohio.

Illinois Clay Products Co., Joliet, Ill.

Ironton Fire Brick Co., Ironton, O.

Keystone Refractories Co. 120 Liberty St., New York 6, N. Y.

Johns-Manville, 22 East 40th St., New York 16, N. Y.

Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.

Mullite Refractories, Shelton, Conn.

National Carbon Co., Div. Union Carbide Corp., 30 East 42nd St., New York 17, N. Y.

North American Refractories Co., National City Bank Bldg., Cleveland 14, Ohio.

North State Pyrophyllite Co. Greensboro, North Carolina

Norton Co., Worcester 6, Mass.

H. K. Porter Co. Inc., Refractories Div., 2500 First National Bank Bldg., Pittsburgh 22, Pa.

Pyro Refractories Co., Oak Hill, Ohio.

Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.

Stroman Furnace & Engineering Co., Div. of Petersen Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

Chas. Taylor Sons Co., 710 Burns St., Cincinnati 4, Ohio.

United States Graphite Co., Saginaw, Mich.

Walsh Refractories, 101 Ferry St., St. Louis 7, Mo.

Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

REFRACTORY GUNS

Blastcrete Equipment Co., 323 East 58th St., Los Angeles 11, Calif.

Cement Gun Co., 1520 Walnut St., Allentown, Pa.

Eastern Clay Products Dept., International Minerals & Chemicals Corp., 20 N. Wacker Drive Chicago 6, Ill.

RELEASE AGENTS

Silicones Division, Union Carbide Corp., 420 Lexington Ave., New York 17, N. Y.

RESIN—See CORE BINDERS (Resin)

RESPIRATORS

American Optical Co., Southbridge, Mass.

RIDDLES (Electric)

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio

Beardsley & Piper Div. Pettibone Mulliken Corp. 2424 N. Cicero Ave., Chicago 39, Ill.

Champion Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.

Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.

Great Western Mfg. Co., Leavenworth, Kans.

RIDDLES (Hand)

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio

Great Western Mfg. Co., Leavenworth, Kansas.

Frederic B. Stevens Inc., 18th St. & Vernor Highway, Detroit 16, Mich.

Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

RISER COMPOUNDS

Foundry Services Inc., 2000 Bruck St., Columbus, Ohio.

Pittsburgh Metals Purifying Co., 1352 Marvista St., Pittsburgh 12, Pa.

U. S. Graphite Co., Saginaw, Mich.

ROD STRAIGHTENERS—See CORE ROD STRAIGHTENING and CUTTING MACHINERY

ROLLER-HEARTH — See FURNACES (Heat Treating and Annealing)

RUBBER LINING MATERIAL (Abrasive Resisting)

B. F. Goodrich Co., Akron 18, Ohio.
Pangborn Corp., Hagerstown, Md.

SAFETY EQUIPMENT

American Optical Co., Southbridge, Mass.

Pangborn Corp., Hagerstown, Md.

United States Rubber Co., 4300 New Haven Ave., Ft. Wayne 4, Ind.

SAND (Core, Molding, Blasting)

Carpenter Brothers, Inc., 606 West Wisconsin, Milwaukee 3, Wis.

Continental Silica Co., P O. Box 124, Somonauk, Ill.

Delhi Foundry Sand Co., 6326 Gracely Drive, Cincinnati 33, Ohio.

Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, Ohio.

Orefraction Inc., 7425 Thomas St., Pittsburgh 8, Pa.

Ottawa Silica Co., Ottawa, Ill.

Pangborn Corp., Hagerstown, Md.

Pennsylvania Glass Sand Corp., 140 Stanwix St., Pittsburgh 22, Pa.

Standard Silica Co., Ottawa. Ill.

Wedron Silica Co., 135 S. LaSalle St., Chicago 3, Ill.

Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

SAND BLAST BARRELS—See BLAST CLEANING EQUIPMENT

SAND BLAST EQUIPMENT—See BLAST CLEANING EQUIPMENT

SAND BLAST NOZZLES—See NOZZLES (Blasting)

SAND BLAST ROOMS—See BLAST CLEANING EQUIPMENT

SAND BLAST TABLES—See BLAST CLEANING EQUIPMENT

SAND CONTROL and TESTING EQUIPMENT

Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.

Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, Mich.

Claud S. Gordon Co. 3000 So. Wallace, Chicago 16, Ill.

Great Western Mfg. Co., Leavenworth, Kans.

Hartley Controls Corp., Neenah, Wis.

National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

Sargent Sand Co. 2840 Bay Road, Saginaw, Mich.

SAND DRYERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.

Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

Nichols Engineering & Research Corp., 70 Pine St., New York 5, N. Y.

SANDING MACHINERY (Disc, Spindle, Belt, etc.)

Cleco Pneumatic Tool Div. Reed Roller Bit Co., Houston, Texas.

Oliver Machinery Company, Grand Rapids 2, Mich.

SAND MEASURING and WEIGHING DEVICES

Baker Perkins Inc., Saginaw, Mich.

Beardsley & Piper Div. Pettibone Mulliken Corp. 2424 N. Cicero Ave., Chicago 39, Ill.

Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

SAND MIXERS—See SAND PREPARATION EQUIPMENT

SAND PREPARATION EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

American Air Filter Co., Louisville 8, Ky.

Baker Perkins Inc., Saginaw, Mich.

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.

Beardsley & Piper Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.

Blystone Division, Standard Sand & Machine Co., 549 W. Washington Blvd., Chicago 6, Ill.

Carrier Conveyor Corp., 211 North Jackson St., Louisville 2, Ky.

Carver Foundry Products Co., 1056 Hershey Ave., Muscatine, Iowa.

Champion Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.

Clearfield Machine Co., Clearfield, Pa.

Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.

Deister Concentrator Co., 901 Glasgow Ave., Ft. Wayne, Ind.

Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, Mich.

Foundry Equipment Ltd. Leighton Buzzard, Bedfordshire England

Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.

B. F. Goodrich Co., Akron 18, Ohio.

Great Western Mfg. Co., Leavenworth, Kansas.

Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, Ohio.

Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

Moulders Friend, Dallas City, Ill.

National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

Newaygo Engineering Co., Newaygo, Mich.

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.

Pekay Machine & Engineering Co., 865 N. Sangamon St., Chicago 22, Ill.

Planet Corp., 1820 Sunset, Lansing 6, Mich.

Royer Foundry & Machine Co., Kingston, Pa.

T. L. Smith Co., 2835 N. 32nd St., Milwaukee, Wis.

States Engineering Corp., 922 W. Berry, Ft. Wayne 2, Ind.

U. S. Forge & Foundry Co., Pulaski, New York.

Wheelabrator Corp., Mishawaka, Ind.

SAND RAMMERS

Beardsley & Piper Div. Pettibone Mulliken Corp. 2424 N. Cicero Ave., Chicago 39, Ill.

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.

Cleco Pneumatic Tool Div. Reed Roller Bit Co., Houston, Texas.

Dayton Pneumatic Tool Co., Dayton 1, Ohio.

Ingersoll Rand Co., 11 Broadway, New York 4, N. Y.

Master Pneumatic Tool Co., Inc., 13 Krick Rd., Bedford, Ohio.

SAND RECLAIMERS

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.

Beardsley & Piper Div. Pettibone Mulliken Corp. 2424 N. Cicero Ave., Chicago 39, Ill.

Deister Concentrator Co., 901 Glasgow Ave., Ft. Wayne, Ind.

Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, Ohio.

Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

Nichols Engineering & Research Corp., 70 Pine St., New York 5, N. Y.

SAND SIFTING and SCREENING MACHINERY—See SAND PREPARATION EQUIPMENT

SAND STABILIZER

Archer-Daniels-Midland Co., Federal Foundry Supply Division, 2191 W. 110th St., Cleveland 2, Ohio.

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, Ohio.

Foundry Services, Inc., 2000 Bruck St., Columbus 7, Ohio.

SAND STORAGE BINS and GATES

American Bridge Div., United States Steel Corp., 525 Wm. Penn Place, Pittsburgh 19, Pa.

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.

Beardsley & Piper Div., Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.

Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

Marietta Concrete Corp., Marietta, Ohio.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Neff & Fry Co., Camden, Ohio.
Newaygo Engineering Co., Newaygo, Mich.
Planet Corp., 1820 Sunset, Lansing 6, Mich.
Westover Corp., 3110 W. Fond du Lac Ave., Milwaukee 10, Wis.

SAWS (Band, Metal, Wood and Saw Accessories)

Carter Products, Grand Rapids 2, Mich.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York 17, N. Y.
DoAll Co., Des Plaines, Ill.
Oliver Machinery Company, Grand Rapids 2, Mich.

SCALING HAMMERS—See PNEUMATIC TOOLS and CHISELS

SCREENS (Shakeout and Vibrating)

Ajax Flexible Coupling Co., Westfield, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Carrier Conveyor Corp., 211 North Jackson St., Louisville 2, Ky.
Diester Concentrator Co., 901 Glasgow Ave., Ft. Wayne, Ind.
Great Western Mfg. Co., Leavenworth, Kansas.
Link-Belt Co., Prudential Plaza, Chicago 1, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

SEA COAL

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Frederic B. Stevens, Inc., Detroit 16, Mich.
Thiem Products Co., 9800 West Rogers, Milwaukee 14, Wis.
Penn-Rilton Co., 324 West 23rd St., New York 11, N. Y.
Whitehead Bros. Co., 324 West 23rd St., New York 11, N. Y.

SEPARATORS (Air, Moisture, Oil)

American Air Filter Co., Louisville 8, Ky.
James A. Murphy & Co. Hamilton, Ohio
Pangborn Corp., Hagerstown, Md.
A. Schrader's Son, 470 Vanderbilt Ave., Brooklyn 38, N. Y.
Wheelabrator Corp., Mishawaka, Ind.

SEPARATORS (Magnetic)

Beardsley & Piper Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, Ohio.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

SHAKE-OUT MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Air Filter Co., Louisville 8, Ky.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
The Branford Co., 130 Chestnut St., New Haven 7, Conn.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, Ohio.
Link-Belt Co., Prudential Plaza, Chicago 1, Ill.
Planet Corp., 1820 Sunset, Lansing 6, Mich.
Rover Foundry & Machine Co., Kingston, Pa.

SHELL MOLDING (Equipment and Accessories)

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Div., Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
C & S Products Co., 18656 Fitzpatrick Ave., Detroit 28, Mich.
Centrifugal Casting Machine Co., Tulsa, Okla.
Foundry Equipment Ltd. Leighton Buzzard, Bedfordshire England
Hutchinson Shell Mold Co., Post Office Box 188, Alton, Ill.
Link-Belt Co., Prudential Plaza, Chicago 1, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.
Shaico Engineering Corp., Palo Alto, Calif.
Shell Equipment Co. Ninth & West Crawford Ave. Connellsville, Pa.
Shell Process Inc., McKinstry Ave., Chicopee, Mass.
Sutter Products Co., Hadley & Grant Sts., Holly, Mich.

SHELL MOLD SAND (Coated)

Acme Resin Corp., Forest Park, Ill.

SHELL MOLDS—See CORE BINDERS (Resin)

SHOT and GRIT

Abrasive Shot and Grit Company, Springville, New York.
Alloy Metal Abrasive Co., 121 South Division St., Ann Arbor, Mich.
Carborundum Co., Niagara Falls, N. Y.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio.
Globe Steel Abrasive Co., Mansfield, Ohio.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, Ohio.
Metal Blast, Inc., 871 E. 67th St., Cleveland, Ohio.
National Metal Abrasive Co., 3560 Norton Ave., Cleveland 7, O.
Norton Co., Worcester 6, Mass.
Pangborn Corp., Hagerstown, Md.
Wheelabrator Corp., Mishawaka, Ind.

SHOT (Peening) — See SHOT and GRIT

SHOVELS

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Frederic B. Stevens, Inc., Detroit 16, Mich.

SHOVELS (Power)

Clark Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.
Frank G. Hough Co., 703 Sunnyside Ave., Libertyville, Ill.
Pettibone Mulliken Corp. 4700 W. Division St., Chicago 51, Ill.

SILICA FLOUR

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Continental Silica Co., P. O. Box 124, Samonauk, Ill.
Ottawa Silica Co., Ottawa, Ill.
Pennsylvania Pulverizing Co., 140 Stanwix St., Pittsburgh 22, Pa.
Standard Silica Co., Ottawa, Ill.
Wedron Silica Co., 135 S. LaSalle St., Chicago 3, Ill.

SILICOMANGANESE

Electro Metallurgical Co., Div. Union Carbide Corp., 535 Fifth Ave., New York 17, N. Y.
Pickands-Mather & Co., Union Commerce Bldg., Cleveland 14, Ohio.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

SILICON (Briquets)

Electro Metallurgical Co., Div. Union Carbide Corp., 535 Fifth Ave., New York 17, N. Y.
Ohio Ferro Alloys Corp., Canton 9, Ohio.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

SILICON CARBIDE (Briquets)

Ohio Ferro Alloys Corp., Canton 9, Ohio.

SILVERY PIG IRON—See PIG IRON (Silvery)

SKIMMERS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Tamms Industries Co., 228 North LaSalle St., Chicago 1, Ill.

SLINGS (Chain)—See CHAIN

SLIP FLASKS—See FLASKS (Slip)

SLIP JACKETS—See MOLD JACKETS

SMELTERS and REFINERS

Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5.

SNAGGING MACHINES—See GRINDERS

SNAGGING WHEELS—See GRINDING WHEELS

SNAP FLASKS—See FLASKS (Snap)

Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio

SODA ASH

Archer-Daniels-Midland Co., Federal Foundry Supply Div. 2191 West 110th St., Cleveland 2, Ohio
Columbia-Southern Chemical Corp., Div., Pittsburgh Plate Glass Co., Pittsburgh 19, Pa.
Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, Ohio.

Hercules Powder Co., Wilmington 99, Del.
Olin Mathieson Chemical Corp., Mathieson Bldg., Baltimore 3, Md.

SOLDER

Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

SPECTROGRAPHIC ANALYSIS (Equipment and Materials)

Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass.
Spectrochemical Laboratories, Inc., P.O. Box 8781, Pittsburgh 20, Pa.

SPRAY GUNS

The Branford Co., 130 Chesnut St., New Haven 7, Conn.
Foundry Services, Inc., 2000 Bruck St., Columbus 7, Ohio.
James A. Murphy & Co. Hamilton, Ohio

SPRUE CUTTERS

Adams Co., Dubuque, Iowa.
Archer-Daniels-Midland Co., Federal Foundry Supply Div., 2191 West 110th St., Cleveland 2, Ohio
Milwaukee Chaplet & Mfg. Co., 1023 S. 40th St., Milwaukee, Wis.
Rice Pump & Machine Co., Belgium, Wis.

STEEL SHOT—See SHOT and GRIT

STEEL (Structural)

American Bridge Co., Div., United States Steel Corp., 52 S. Wm. Penn Place, Pittsburgh 19, Pa.

STRAINER CORES—See CORES (Strainer, Ceramic)

STRIPPING MACHINES—See PATTERN DRAW MACHINES

TELLURIUM

American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

TEMPERATURE CONTROLLERS

Foxboro Company, Foxboro, Mass.
Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.
Leeds & Northrup 4901 Stenton Ave., Philadelphia 44, Pa.
Marshall Co., L. H., 270 W. Lane, Columbus 14, Ohio.
Minneapolis-Honeywell Co., Wayne and Windrim Aves., Philadelphia 44, Pa.

TENSILE TESTING MACHINES

Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.

TESTING EQUIPMENT—See Type of Test

THERMOCOUPLES

Claud S. Gordon Co., 3000 So. Wallace, Chicago 16, Ill.
Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 14, Ohio.
Pyrometer Instrument Co., Bergenfield, N. J.
Tamms Industries Co., 228 N. LaSalle St., Chicago 1, Ill.

TIMERS (Electric)

Beardsley & Piper Div. Pettibone Mulliken Corp. 2424 N. Cicero Ave., Chicago 39, Ill.
Carver Foundry Products Co., 1056 Hershey Ave., Muscatine, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

TIN

Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.
Henning Bros. & Smith Inc., 91 Scott Ave., Brooklyn, N. Y.

TIRES (Industrial)

Mitchell Industrial Tire Co., 1400 East 40th St., Chattanooga 7, Tenn.

TONGS

Industrial Equipment Co., Minster, Ohio.

TORCHES and BURNERS (Acetylene, Gas, Oil)

Linde Co., Div. Union Carbide Corp., 420 Lexington Ave., New York 17, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.

TORCHES (Gouging and Cutting)—See WELDING, CUTTING and GOUGING APPARATUS

TOTE BOXES—See BOXES (Stacking, Tote)

TRACTORS—See TRUCKS (Utility and Power Lift)

TRAMRAIL SYSTEMS—See CONVEYORS (Overhead Monorail)

TROLLEYS

Curtis Pneumatic Machinery Div. Curtis Mfg. Co., 1905 Kienlen Ave., St. Louis 20, Mo.
Link-Belt Company, Prudential Plaza, Chicago 1, Ill.
Modern Equipment Co., Port Washington, Wis.
Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa.

TRUCK CRANES

Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio.

TRUCKS (Core)

Beardsley & Piper Div. Pettibone Mulliken Corp. 2424 N. Cicero Ave., Chicago 39, Ill.
Buda Div., Allis Chalmers Mfg. Co., 1123 South 70th St., Milwaukee 14, Wis.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Clark Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Kirk & Blum Mfg. Co., 3108 Forrer St., Cincinnati 9, Ohio.
Pettibone Mulliken Corp. 4700 W. Division St., Chicago 51, Ill.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

TRUCKS (Utility and Power Lift)

Beardsley & Piper Div. Pettibone Mulliken Corp. 2424 N. Cicero Ave., Chicago 39, Ill.
Buda Div., Allis Chalmers Mfg. Co., 1123 South 70th St., Milwaukee 14, Wis.
J. I. Case Co., Racine, Wis.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Clark Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.
Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio.
Frank G. Hough Co., 703 Sunnyside Ave., Libertyville, Ill.
Hyster Co., 2902 N.E. Clackamas St., Portland 8, Oregon.
Kwik-Mix Co., 3026 West Concordia, Milwaukee 16, Wis.
Pettibone Mulliken Corp. 4700 W. Division St., Chicago 51, Ill.
Ready Power Co., 3826 Grand River Ave., Detroit 8, Mich.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Tractomotive Corp., Deerfield, Ill.
Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa.

TUMBLING BARRELS

Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

TUMBLING STARS

Quincy Foundry Inc., Quincy, Ohio

TURNTABLES

Beardsley & Piper Div. Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
Modern Equipment Co., Port Washington, Wis.
Newaygo Engineering Co., Newaygo, Mich.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

UNLOADERS (Car)

Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

VACUUM DEGASSING EQUIPMENT

Centrifugal Casting Machine Co., Tulsa, Okla.

VALVES (Air, Oil, Water, Steam)

Cleco Pneumatic Tool Div. Reed Roller Bit Co., Houston, Texas.
Galland-Henning Mfg. Co. 2753 S. 31st St. Milwaukee 7, Wis.
C. B. Hunt & Son Inc., Salem, Ohio.
Ross Operating Valve Co. 120 East Golden Gate, Detroit 3, Mich.

VALVES (Blow-off and Cut-off)

Bellows Co., 230 West Market St., Akron 3, Ohio.
Champion Div. Pettibone Mulliken Corp., 2424 N. Cicero, Chicago 39, Ill.
Cleco Pneumatic Tool Div. Reed Roller Bit Co., Houston, Texas.
C. B. Hunt & Son Inc., Salem, Ohio.
Ross Operating Valve Co. 120 East Golden Gate, Detroit 3, Mich.

VALVES (Oxygen, Acetylene)

Linde Co., Div. Union Carbide Corp., 420 Lexington Ave., New York 17, N. Y.

VENTILATING — See DUST COLLECTING, VENTILATING, EXHAUST, COOLING SYSTEMS

VENTS (Corebox)

Carver Foundry Products Co., 1056 Hershey Ave., Muscatine, Iowa.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Demmler, Wm., & Bros., Kewanee, Ill.
C. M. Smillie & Co., 1124 Woodward Hgts. Blvd., Ferndale 20, Mich.

VIBRATORS

Adams Co., Dubuque, Iowa.
Beardsley & Piper, Pettibone Mulliken Corp., 2424 No. Cicero, Chicago 39, Ill.
The Branford Co., 130 Chestnut St., New Haven 7, Conn.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York 17, N. Y.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
Davenport Machine & Foundry Co., Davenport, Iowa.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link-Belt Co., Prudential Plaza, Chicago 1, Ill.
National Air Vibrator Co., 2372 West Seventh St., Cleveland 13, Ohio
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
Tabor Mfg. Co., Div. Turbo Machine Co., Lansdale, Pa.

VISES (Hydraulic, Mechanical, etc.)

Desmond-Stephan Mfg. Co., Urbana, Ohio.

WASHES—See CORE and MOLD WASH

WEDGES (Foundry)

Adams Co., Dubuque, Iowa.

WELDING APPARATUS (Electric Arc, Inert Gas)

Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis.
Linde Co., Div. Union Carbide Corp., 420 Lexington Ave., New York 17, N. Y.

WELDING, CUTTING and GOUGING APPARATUS and SUPPLIES

Arcair Co., 423 South Mt. Pleasant Ave., Lancaster, Ohio.
Hoeganaes Sponge Iron Corp., Riverton, New Jersey.
Linde Co., Div. Union Carbide Corp., 420 Lexington Ave., New York 17, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.
Wilson Welding Co., 221 High St., Altizer Addition, Huntington, W. Va.

WELDING ELECTRODES (Carbon)

United States Graphite Co., Saginaw, Mich.

WELDING GAS—See GAS

WELDING RODS and ELECTRODES

Carborundum Co., Perth Amboy, N. J.
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.
Linde Co., Div., Union Carbide Corp., 420 Lexington Ave., New York 17, N. Y.
National Carbon Co., Div. Union Carbide Corp., 30 East 42nd St., New York 17, N. Y.
Whitehead Metal Products, 303 West 10th St., New York 14, N. Y.

WHEELBARROWS

Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WHEELS (Abrasive Contact)

Chicago Rubber Co., Waukegan, Ill.

WHEELS (Wire Brush)

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.

WIRE CUTTERS

Archer-Daniels-Midland Co., Federal Foundry Supply Division, 2191 West 110th St., Cleveland 2, Ohio.

WOOD FLOUR

Eastern Clay Products Dept., International Minerals & Chemical Corp., 20 N. Wacker Drive, Chicago 6, Ill.

WIRE NAILS

Republic Steel Corp., 3100 E. 75th St., Cleveland 27, Ohio.

WIRE ROPE

American Chain & Cable Co., Inc., 271 South Pennsylvania Ave., Wilkes-Barre, Pa.

WOODWORKING MACHINERY

DoAll Company, Des Plaines, Ill.
Oliver Machinery Co., Grand Rapids 2, Mich.

X-RAY EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Ansco Co., 171 Clinton St., Binghampton, New York.
Picker X-Ray Corp., 25 S. Broadway, White Plains, N. Y.

X-RAY FILM and ACCESSORIES

Ansco Co., 171 Clinton St., Binghampton, New York.
Eastman Kodak Co., Rochester, N. Y.
Picker X-Ray Corp., 25 S. Broadway, White Plains, N. Y.

ZINC

Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.
Benjamin Harris & Co., 11th & State Sts., Chicago Heights, Ill.
Henning Bros. & Smith Inc., 91 Scott Ave., Brooklyn, N. Y.

ZIRCON SAND

Berkshire Chemicals, Inc., 420 Lexington Ave., New York 17, N. Y.
Orefraction Inc., 7425 Thomas St., Pittsburgh 8, Pa.

CLASSIFIED ADVERTISING

Help Wanted

MELTING **HEAT TREATING**
GATING AND RISERING **METALLOGRAPHY**

Engineers experienced in any of these fields can find a secure, challenging, and extremely interesting position with an aggressive, modern, investment casting company located in the East. Please forward complete resume.

BOX 980, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

CASTING ENGINEER

ALUMINUM AND MAGNESIUM

We are a medium sized foundry operating in the Chicago area producing aircraft quality castings from aluminum and magnesium. We are expanding this operation under young aggressive management so we have an excellent opportunity for a graduate engineer with a background in the design, layout and production of light metal aircraft castings. Please submit a brief resume. Salary depends upon experience. All replies will be held in strict confidence.

BOX 954, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

INVESTMENT CASTING

Progressive West Coast investment casting company has the following permanent openings for experienced personnel:

CHIEF METALLURGIST—Degree required, plus minimum of 2 years' experience with investment casting ferrous metals.

TOOL & DIE FOREMAN—Must have minimum of 2 years' experience with wax molding dies. Supervisory experience required.

CHIEF INSPECTOR—Minimum of 1½ years' experience with inspection of investment castings. Supervisory experience required.

Send resume to:

BOX 960, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

ENAMEL ROOM FOREMAN

Shift foreman for dry process enameling cast iron sanitary ware. Experience in dry process enameling a must. Here is an opportunity to work for a reliable, old line company. Excellent company benefits.

INGERSOLL-HUMPHRYES DIVISION
Borg-Warner Corporation
201 E. FIFTH STREET
MANSFIELD, OHIO

FOUNDRY SUPERVISOR

Technical or Production man with opportunity for advancement as part of Executive Management. Gray Iron. Philadelphia area. Well experienced. Must have technical ability, thorough knowledge of metal, sand, patterns, mechanization, automation, etc. Good personality. Available immediately. Give references. Address: Box 949, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GENERAL FOUNDRY FOREMAN

For mechanized ferrous foundry in Midwest. Must be experienced in gating. Have knowledge of Standard Costs. Supervise all molding operations. Submit confidential resume. Address: Box 939, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

FOUNDRY METALLURGIST

A Foundry Research Metallurgist with a minimum of a B.S. degree and 5 years of experience in foundry operations plus an excellent knowledge of the fundamentals of metal casting is required for a challenging and creative research assignment. Clear analytical thinking and articulate writing ability is an essential requisite for this position.

Located in the Chicago metropolitan area, we offer a generous relocation allowance, excellent employee benefits in addition to an outstanding opportunity for advanced educational training and professional recognition. Salary commensurate with experience.

All replies will be treated as confidential. Please send complete resume to:

A. J. PANERAL
ARMOUR RESEARCH FOUNDATION
Of Illinois Institute of Technology
10 West 35th Street
Chicago 16, Illinois

FOUNDRY METALLURGISTS

Opportunity is knocking for a gray iron foundry metallurgist under 40 who:

1. Would like complete charge of metallurgy, sand control, and foundry engineering with a medium sized gray iron jobbing foundry beautifully situated in New England.
2. Wants to grow with two young men in developing a well established business into an outstanding foundry.

This is a rare opptrtunity for a well trained man to fit into a situation that is challenging, stimulating and rewarding.

BOX 932, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

CORE ROOM SUPERINTENDENT

A large production jobbing foundry needs an experienced, capable man to supervise the Core Department. He must have supervisory experience in a similar operation as he would be in charge of three foremen and approximately ninety workers. This job requires technical core room knowledge plus considerable scheduling and administrative ability. This well established foundry is a leader in its field and is interested in the most qualified people available.

BOX 959, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

QUALIFIED METALLURGIST

With at least five years' minimum gray iron foundry experience, to take complete charge of cupola operation and sand control. Foundry located in Indiana.

BOX 956, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

Help Wanted

ASSISTANT FOUNDRY SUPERVISOR

KEY POSITION IN CAPTIVE MEEHANITE FOUNDRY for individual, age 25 to 40, with college background or equivalent. Must have at least four years' practical experience in heavy gray iron foundry work, including pit molding.

IMMEDIATE BENEFITS in addition to liberal salary include: Exclusive profit sharing plan plus a company-paid hospitalization, life insurance plans, and up to 80% in payments for outside advance education.

LOCATED in beautiful southeastern Pennsylvania—fine schools, excellent housing and living conditions.

BOX 967, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRY SUPERINTENDENT

Excellent opportunity for man experienced in all phases of gray iron foundry operation producing light and medium weight castings up to 10,000 pounds. Must have aggressive leadership and administrative qualifications to manage entire foundry employing about 130 men. Location—Western Pennsylvania.

Please send full resume of experience and qualifications; also recent photo if possible.
All replies confidential.

BOX 962, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRY METALLURGIST

To be assistant to the General Manager and have responsibility for operations: Melting, molding, coremaking and all related practical functions. Not a laboratory position. Will be supported by a highly qualified staff. This foundry is one of the most progressive in the growing Los Angeles area. It is licensed by the Meehanite Metal Corp. to produce irons by their process, and plans call for expansion into production of specialty alloyed iron castings. Now producing castings to 4,000 lbs. mostly for the machinery and tool trade. We are looking for a man worth $10,000 or more, and will pay accordingly. Write to:

James Barr
COMPTON FOUNDRY
1320 S. ALAMEDA ST.
COMPTON, CALIFORNIA

GRADUATE MECHANICAL ENGINEER

Captive foundry producing gray and ductile iron requires a man with experience in planning foundry layout and production methods and design and selection of foundry equipment. Information submitted will be treated confidentially. Location is in a progressive community within 100 miles of Chicago.

BOX 950, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

CLASSIFIED ADVERTISING

Help Wanted

DIRECTOR OF QUALITY CONTROL

An aggressive mechanized gray iron foundry in the midwest area desires a qualified foundryman to take over and direct their Quality Control program. Must be well experienced in metallurgy, cupola operation, sand control and general foundry operation. Prefer a man with B. S. or B. E. degree, between 35 and 45 years of age. This is an exceptional opportunity for the right man.

Address replies to:

CHARLES F. SEELBACH, JR.
FOREST CITY FOUNDRIES COMPANY
2500 WEST 27TH STREET
CLEVELAND 13, OHIO

HELP WANTED

Expanding Chicago area foundry has lifetime job for experienced nonferrous castings salesman. Require integrity and a minimum of five years' experience. Salary and expenses plus commission on new accounts. Address: Box 955, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

STEEL—GRAY IRON

Complete system of sand control can reduce production costs considerably in most foundries and improve sales-appeal of products when carried out consistently under competent and experienced direction. Education and twenty years' experience in this specialized field and related foundry problems. Valid reasons for making new affiliation. Available about July 15; interview any time or AFS Castings Show during May. Preferred areas: Milwaukee, Omaha, Denver, San Diego, Portland, Spokane, British Columbia. Address: Box 921, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

ENGINEER-MANAGER

Experienced man under 40 seeking substantial interest in small foundry operation. Participation optional. Replies confidential. Address: Box 983, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT OR MANAGER

Young foundryman thoroughly versed in all gray iron operations. Degree in Metallurgical Engineering. Interested in responsible position with opportunity. Address: Box 944, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN

Thirty-eight years' experience in all phases of foundry operation. High grade castings for diesel engines, machine tools, and general jobbing. Good labor relations. Age 56. Available immediately. Address: Box 978, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

PERMANENT MOLD FOUNDRYMAN

Graduate metallurgist experienced in design, estimating, operation. Over 20 years in nonferrous castings, including sand, shell and die casting. Address: Box 964, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MANAGER—SUPERINTENDENT

Well-known ferrous—nonferrous foundryman and consulting authority on foundry practice desires a good permanent association with a progressive firm. Address: Box 963, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MANAGER

Have extensive background in all phases of manufacturing, plant layout, methods and foundry practice, offering maturity of judgment and proven ability for cost saving. Excellent references. Address: Box 925, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

TRAINED STEELMOLDER

German, living in Canada, age 22, with six years in various types of steel molding, seeking new connection. Willing to locate anywhere. Address: Box 930, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

AVAILABLE RIGHT-HAND MAN

For superintendent or quality control in gray iron foundry. Know sand control, cores, dry sand, rigging, metallurgy, maintenance, loose pattern, slinger, incentive systems. Older type or mechanized shop. Experience in setting up mechanization and practical foundry engineering. If you have problems with scrap, or trouble getting competitive production, I can help you. Casting to 20,000#. More than average experience and ability. Good diplomatic relations. Under 40. Address: Box 982, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN

Experienced foundry supervisor and production manager seeking employment in the above capacities. Formerly with foundry pouring 150 to 200 tons daily. Age 43 and available immediately. Address: Box 953, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

ANALYTICAL CHEMIST

Seven years' experience in the ferrous industry with technical sand control and metallurgical background. Seeking affiliation with progressive company. Presently employed as supervisor of laboratory and melting. Address: Box 970, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GRAY IRON METALLURGIST

Nineteen years experience jobbing, heavy machinery, automotive and powdered iron melting; covering metal, sand and casting quality control. Illinois Tech student, age 46. Salary open. Will relocate. Address: Box 929, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

METALLURGICAL ENGINEER

Manager in his fifties would like full or part time position setting up research and development department for progressive small or medium-size foundry. Address: Box 926, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

METALLURGIST

Experienced in various foundry techniques such as melting, sand control, heat treat and laboratory. At present and for past eleven years employed as metallurgist in malleable foundry. Desire to make change to progressive organization. 45 years of age, married and two children. Address: Box 973, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRYMAN

Experienced in all phases of foundry operation—gray iron and nonferrous. Capable of taking full charge or as assistant. Now employed, general jobbing superintendent. Familiar and experienced in light production. Available shortly. Address: Box 985, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT

On heavy jobbing diesel, compressor, machine tool, ductile, Meehanite high alloy, 36 years' experience. Will relocate anyplace in U. S. Address: Box 984, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY MANAGER

Young metallurgical engineer with fourteen years' foundry experience. Superintendent for the last four years. Interested in responsible position with opportunity. Address: Box 975, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

ASSISTANT SUPERINTENDENT OR FOUNDRY METALLURGIST

Experienced in melting, molding, sand control, annealing, coremaking, pattern layout, gating and risering of gray iron, malleable, pearlitic malleable and steel. Two years' technical foundry training after B.S. degree. Address: Box 943, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

PRODUCTION ENGINEER

Experienced in cleaning and finishing Steel and Alloy Castings, weighing 1 to 500 pounds. Prefer Ohio, Pennsylvania, or Eastern States. Address: PETER WORTHY, 940 FRANKLIN ST., McKEESPORT, PENNSYLVANIA.

SUPERINTENDENT OR MANAGER

Progressive foundryman familiar with every phase of practical experience on all classes of work. Now employed. Would like to make change. Address: Box 934, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT OR MANAGER

Progressive foundryman with 30 years' experience in all phases of quality production of gray iron castings, squeezer, floor and mechanized. Address: Box 966, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

FOUNDRY MANAGEMENT

Aggressive foundryman seeks management position with progressive foundry. Experienced production supervisor and chief inspector in gray iron foundry. Three years' experience in shell molding. Graduate industrial engineer. Address: Box 981, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Thorough knowledge of all phases of nonferrous metals. Understand gating, jobbing, floor, machine and plumber supplies. Can also produce pressure tight and porous free castings. Know sand control and core room work. Address: Box 977, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRYMAN

Practical and technical, gray iron and malleable foundryman, desire position as trouble shooter or superintendent of captive or jobbing shop. At present employed as superintendent of mechanized malleable foundry. Age 47. Address: Box 968, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

CASTING SALES

Sales Manager 4A-1 foundry available May 1st. Age 45. Sales life devoted to aluminum, bronze, gray iron, sand and permanent mold. Looking for opportunity to hang up hat, roll up sleeves and sell, sell, sell. Let's fight this thing together by getting a bigger bite of the market. Will relocate. Address: Box 971, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

CHIEF INSPECTOR

Recently severed connection as Chief Inspector of midwest's largest jobbing foundry and production plant. Familiar with all phases of foundry and production inspection methods and procedures, machining, etc. Have initiative and ability to organize and successfully deal with your cost reduction problems. Detailed resume on request. Address: Box 957, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

CLEANING ROOM FOREMAN

With 25 years' experience processing castings of all kinds. Free to relocate. Address: Box 974, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Foundry Consultants

CONSULTING ENGINEER
Thirty-five years' Experience
Acid and Basic Practice

Improved methods in electric furnace melting. Low cost with high productivity. Avoid expensive mistakes. Acquire consultation prior to the purchasing of your new furnace and in planning, modernizing, and organizing of your melt shop.

EUGENE H. WEAK 2933 HIGHWAY AVE.
HIGHLAND, IND. PHONE: TEMPLE 8-1244

FOUNDRY CONSULTANT—NONFERROUS

Sand — permanent mold — centrifugal permanent mold — and centrifuge permanent mold. High pressure castings a specialty. Address: ED JENKINS, RT. #3, BOX 345, WALKERTON, INDIANA, PHONE: 712W.

METALLURGICAL CONSULTANT

Available for Melt Shop Problems in technical and customer service. Broad industrial experience in all processes for carbon, low and high alloy iron, and steel making. Address: Box 965, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY CONSULTANT

Ferrous and nonferrous. Correct methods and practices necessary to profitable foundry operation. Address: CHARLIE AMMEN, 1029 PHILIP ST., NEW ORLEANS, LA.

Opportunity

PERMANENT MOLD METHOD AVAILABLE

THE WAGNER PERMANENT MOLD CO., 2910 Empire Ave., Burbank, California, has developed a Permanent Mold Method for ferrous and nonferrous metals and invites inquiries from any country regarding this method and process.

CLASSIFIED ADVERTISING

Employment Service

FOUNDRY PERSONNEL SPECIALISTS

National Placement and Procurement of

GENERAL AND PLANT MANAGERS, PLANT SUPERINTENDENTS, FOREMEN—ALL DEPARTMENTS, METALLURGISTS, ENGINEERS, CONTROLLERS, ACCOUNTANTS, SALESMEN, SALES MANAGERS, PERSONNEL DIRECTORS, PURCHASING AGENTS

Confidential Inquiries Invited

From Employers and Qualified Applicants

For Fast Competent Assistance Contact

DRAKE PERSONNEL, INC. **HARRISON 7-8600**
JOHN COPE, DIRECTOR **220 SOUTH STATE ST., CHICAGO, ILL.**

SALARIED PERSONNEL

$5,000-$30,000. This nation-wide service successful since 1927 finds openings in your field. Sells your abilities; arranges contacts. Present position protected. Write for details. Address: JIRA THAYER JENNINGS, P. O. BOX 674, MANCHESTER, VERMONT.

Representatives Wanted

REPRESENTATIVES WANTED

Manufacturers require agent in all parts of the U. S. Principals at Cleveland in May.

BOX 947, FOUNDRY
PENTON BLDG. **CLEVELAND 13, OHIO**

Representative Available

LINES WANTED

Aggressive representation offered for all castings in Philadelphia area. Sand, permanent mold, shell, precision and die castings, aluminum, magnesium, bronze, gray iron and steel. Let's get this show on the road. Address: Box 972, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Wanted-To-Buy

WANTED

2" Sand belts—Hot Sand and Cold Drives, Transfer and Straight Pulleys

2—4 x 6 Simplicity Shakeouts

8—Molders Hoppers

BOX 958, FOUNDRY
PENTON BLDG. **CLEVELAND 13, OHIO**

WANTED

1 ladle, 7000-8000 pound capacity, lip pour, enclosed gearing.

JOHNSTON & JENNINGS FOUNDRY CORP.
499 E. 16TH STREET
CHICAGO HEIGHTS, ILLINOIS

WANTED

Approximately 5' x 5' x 5' Heat Treating Furnace for magnesium castings. Must be in condition to be government certified. Address: Box 948, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

COMPLETE SHELL MOLDING EQUIPMENT

This equipment is wanted for experimental work and limited production. Please give detailed list of equipment and your price f.o.b. your plant. Address: Box 951, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

WANTED TO BUY

Used No. 610 Clearfield Muller, enclosed gear type. Must be in good condition. Also permanent type Magnetic Pulley, approximately 12" dia. x 18". Address: BOX 71, FAIRMONT, W. VA.

MIXER WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address: Box 578, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Foundry Wanted

FOUNDRY WANTED

Interested in purchasing small aluminum and brass foundry in New York Metropolitan area. Replies confidential. Address: Box 919, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Foundries For Sale

FOUNDRY FOR SALE

Well established brass and aluminum foundry. Located in the Los Angeles area. Well equipped, high capacity for jobbing or production. Over 25,000 sq. ft. Owner retiring.

BOX 976, FOUNDRY
PENTON BLDG. **CLEVELAND 13, OHIO**

FOUNDRY FOR SALE

Nonferrous foundry, located in Michigan. Equipment and buildings in A-1 condition, extra lot included. RR siding and good truck facilities. Complete setup to accommodate five molders. This is a going business and must be seen to be appreciated. Address: Box 979, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

For Sale

SAND BLAST EQUIPMENT
SELL-BUY-TRADE
GUARANTEED MACHINES
TERMS: 3 YEARS TO PAY

9' LG-14 Pangborn Table	$4500.00
Pangborn 8 x 10 Room	2800.00
Pangborn 53 EN2 Hand cabinet	325.00
Pangborn Auto Peening cabinet	1100.00
48 x 48 Wheelabrator Tum. w/loader	5000.00
42 x 48 Wheelabrator Tum. w/loader	2500.00
27 x 36 Wheelabrator Tum. w/loader	2750.00
15" Continuous Wheelabrator Tumblast	1000.00
8' Wheelabrator Table Blast	2000.00
7GK2 Pangborn Rocker Barrel	2000.00
14 LG5 Pangborn Rotoblast Multi-Table w/5—5' tables	9000.00
Pressure Tanks, all types	150.00 up
Vapor Blast cabinets	400.00

All types and sizes of Hand Cabinets, Dust Collectors, Pressure tanks, Rooms, Horizontal or Vertical Tumbling Barrels and additional Sand Blast Equipment too numerous to mention.

DIAMOND SALES, INC.
5654 W. Jefferson
Detroit 9, Michigan
VI-36750

We will Buy one piece or your entire plant; or represent you at any auction at a savings to you.

FOR SALE

Roots-Connersville positive blower, 22 x 54 with Airway Control. Used with #9½ cupola, late type, excellent condition. Address: WRIGHT SURPLUS SALES, 511 FREEMAN AVENUE, CINCINNATI 3, OHIO, PHONE: DUnbar 1-5335.

For Sale

FOR SALE

Simpson No. 1 Muller
Simpson No. 1½ Muller
Simpson No. 2 Muller with loader
American Tumblast, 27 x 36 with loader
American Tumblast, 36 x 42
Milwaukee 163 Jolt Stripper
Champion J8L 12 Pin lift, jolt
Osborn 710 J, jolt, pin lift
Osborn 212J, Jolt Squeeze
Osborn 275J, Jolt Squeeze
Osborn 276J, Jolt Squeeze
International LJS, Jolt Squeeze
International PJS, Jolt Squeeze
Milwaukee 104 Jolt Squeeze
Champion JS 108 Jolt Squeeze
Arcade 1008 Jolt Squeeze
Spo 110 Jolt Squeeze
Davenport Rollover 28 SA
International Rollover 30 x 8 portable
International Rollover 2410 G portable
International Rollover 30 x 8 no jolt
Tabor rollover 30 x 40 portable
J & J 610 B rollover portable
International pin lift
Davenport pin lifts
Osborn 559 pin lift
Spo 506 jolt rollover, pin lift, draw
Nichols plain molding machine, high speed
International plain jolt, 36 x 45 table
International Type R core rollover, hand
Swing Grinders
Royer sand preparators
Simplicity preparators
B & P preparators
Blystone sand mixers
Coleman core ovens
Porbeck core ovens
Grinders ½ hp to 25 hp
Disc grinders
Ladles from 50 lb. to 10,000 lb.
Pouring Devices 500 lb. to 2000 lb.
Gyratory riddles
Monorail and bridges
Air Hoists 250 lb. to 10,000 lb.
Overhead chain conveyor #458, track, drives. etc.
Blowers-Centrifugal-positive-exhaust
Dust collectors all sizes

F L A S K S
A L U M I N U M
S L I P and P O P
Sizes from 10" x 10" to 48" x 48"
J A C K E T S
Aluminum and Iron
S T E E L F L A S K S
Sizes from 10" x 15" to 9' x 9'
C O R E P L A T E S
Transite —— Iron —— Aluminum

MANY OTHER ITEMS IN STOCK
SEND US YOUR INQUIRIES
WE BUY — SELL — TRADE

THE HOMAN MACHINERY CO.
710 E. FRONT ST. **MAIN 10339**
CINCINNATI 2, OHIO

FOR SALE

#1½ SIMPSON MIXER—WITH LOADER UD Model—Ser. 82907 ..... $3500.00
TABOR JOLT ROLLOVER MOLDING MACHINE, 30" x 40"; 12" draw; shockless; 1000# cap. 650.00
WORTHINGTON AIR COMPRESSOR, 6 x 7, 15 HP; Ser. #L 51311 ..... 950.00
GARDNER HORIZ. DISC GRINDER, 54"; 20 HP 650.00
DETROIT ROCKER BARREL ELECTRIC FURNACE, 350# cap. Ser. #289 .. 1950.00

Also other foundry equipment

FOR THE BEST DEAL CALL

BALCHER MACHINERY COMPANY
695 E. 152nd Street
Cleveland 10, Ohio
Telephone: GLenville 1-2474

CLASSIFIED ADVERTISING

For Sale

FOR SALE

2 MODERN YARD CRANES

7½ Ton Whitings, 40′ Span, A.C.

New 1953, Cab Control, with 420′

Crane Runway, Bolted Construction.

BOX 969, FOUNDRY

PENTON BLDG. CLEVELAND 13, OHIO

ROTOBLAST

Pangborn, Model ES-223, 4-position complete with motors, component parts and installation prints. On skids. Original cost approximately $20,000. For quick deal FOB cars $3500.00.

GENERAL MACHINERY & EQUIPMENT CO., INC.
809 WOODLAND AVENUE
KANSAS CITY 6, MISSOURI

SHELL MOLDING MACHINE

Late model Shell Process automatic molding machine—pattern size 20" x 30", gas fired, 220-60-3, excellent condition, operating now.

J. T. MOORE
WELLS MANUFACTURING COMPANY
SKOKIE, ILLINOIS

For Sale

FOR SALE

1—Simpson #0 Muller—Style M (never used).
1—Lancaster Stainless Steel Counter-Current Batch Mixer, Type LW-62.
1—Lancaster Mixer, Model EBG-4.
1—Lancaster Mixer, Model EAG-3.
1—Ingersoll Rand Air Compressor, Type PRE-2, 24" x 16", 100# pressure with 300 HP motor.
3—Link Belt Roto-Louver Rotary Dryers. Models: 207-10; 310-16 and 502-20.

R. GELB & SONS, INC.
U. S. HIGHWAY 22, RAHWAY VALLEY R.R.
UNION, NEW JERSEY

FOR SALE OR LEASE
ALUMINUM AND IRON
FOUNDRY EQUIPMENT

Furnaces, Blowers, Flasks, etc.
250 Aluminum Match Plates
All Popular Old Lace Grillwork Patterns
Lawn Furniture Patterns

BOX 961, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOR SALE

Two (2) Newaygo "Handy Sandys" Model HS-7-G. This equipment was used only a few weeks and is a real buy.

PERU FOUNDRY COMPANY
PERU, INDIANA

FOR SALE

MOTORS—GENERATORS
TRANSFORMERS
Unused—Rebuilt
WORLD'S LARGEST INVENTORY
ELECTRIC EQUIPMENT COMPANY
Phone station Collect GLenwood 3-6783
P.O. Box 51—Rochester 1, New York

FURNACES FOR SALE

Ten used heat treating furnaces and two 7-ton gantry cranes. Good condition, priced to sell. Address: BAER STEEL PRODUCTS, INC., BOX 1428, BOISE, IDAHO.

FOR SALE

79-60 Model M American Sand Cutter, No. 270. Excellent condition. Address: LA PORTE FOUNDRY COMPANY, LA PORTE, INDIANA.

For Sale

FOR SALE

2—Ingersoll-Rand Air Compressors, good condition:

1—PRE2, 24 x 12½ x 14 stroke, 210 HP, 440 volt synchronous motor, complete with exciter. Serial No. 40569-40570.

1—Type 10, 17 x 10½ x 14 stroke, 150 HP, 440 volt belt driven motor, complete with reduce voltage compensator, Serial No. 36266-36265.

ALBION MALLEABLE IRON COMPANY
ALBION, MICHIGAN

AIR HOIST

NEVER USED!

1 Ingersoll Rand Size B, 1000# capacity complete with air motor driven trolley and pendant control. List price $1505.00. Save over 40%. Will sell for $895.00.

SEND FOR COMPLETE AIR TOOL CATALOGUE!

U. S. INDUSTRIAL TOOL & SUPPLY CO.
8960 GREENFIELD DETROIT 28, MICHIGAN
PHONE: BROADWAY 3-8318

FOR SALE

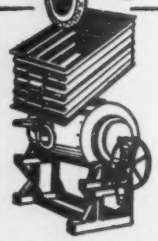
AMERICAN WHEELABRATOR SERIAL #A-94368, 48" x 42" WITH LOADER—DUST COLLECTOR (OPTIONAL) 220/440 PRE-WIRED, NEW COST $16,000—YR. 1953, USED APPROXIMATELY 8 MONTHS. NEW SPARE PARTS INCLUDED. BEST OFFER—MUST MOVE 20 DAYS, LOCATED CHICAGO—PRIVATE PLANT. ADDRESS: FOUNDRY ASSOCIATE'S, 4601 WEST ROSCOE, CHICAGO, ILLINOIS, SPring 7-6654.

FOR SALE

Core Blower, Champion CB15, excellent condition, capacity 50/55 lbs., used 6 months, priced to sell. Also, Redford #2 Core Blower, factory rebuilt in guaranteed condition, subject to prior sale, $500.00. Address: Box 952, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

CUPOLAS FOR SALE

J. W. Paxon #9 with 72" shell diameter. Also Whiting size 3½. Make offer. Address: BERGEN MACHINE & TOOL CO., 189 FRANKLIN AVE., NUTLEY, NEW JERSEY.



EUCLID FOUNDRY & MACHINE EQUIPMENT CO.

14919 SARANAC ROAD CLEVELAND 10, OHIO

OSBORN ROLLOVERS:
4—405, 18" draw, air clamps, 3500# cap.

WHEELABRATORS
1—20" x 27" 2 cu. ft. Tumblast
1—27" x 36", 5 cu. ft. Tumblast, w/loader
1—36" x 42", 11½ cu. ft. Tumblast, w/loader
1—42" x 48", 17½ cu. ft. Tumblast, w/loader
1—36" x 42" air blast Wheelabrator
1—4′ Swing Out Table

PANGBORN
1—18 cu. ft. Rotoblast Master, w/loader

SAND SLINGERS
1—B-P Riddle type, 19" head, 4" tip
1—B-P Motive Jr., 19" head, 4" tip

SWING GRINDERS
10—10 H.P. Mummert-Dixon Model 1814
3—25 H.P. Safety Grinding Wheel Model 204

ELECTRIC FURNACES:
1—80 lbs. Detroit Rocking
1—350 lbs. Detroit Rocking

ASK FOR OUR COMPLETE LISTING — GLENVILLE 1-1222

PUBLIC AUCTION SALE

MODERN GRAY IRON & ALUMINUM FOUNDRY

ON THE PREMISES CLEVELAND FOUNDRY COMPANY

2818 HARVARD AVENUE • CLEVELAND, OHIO

SALE DATE: WED., MAY 21, '58 AT 10:30 A.M.—INSPECTION FROM MAY 19

AIR COMPRESSORS

1—INGERSOLL RAND 2-stage water cooled, horizontal with 100 HP motors and controllers
1—CURTIS, size 4¼ x 3¾, 5 HP motor
1—QUINCY, size 4 x 3½, 10 HP motor

CLEANING EQUIPMENT

1—AMERICAN WHEELABRATOR Tumblast, 27" x 36", new 1956, with skip hoist and dust collector
1—AMERICAN WHEELABRATOR Tumblast, 42" x 48", new 1953, with or without Loader
1—AMERICAN Tablast, Model 1A, 4' dia. table
5—AMERICAN WHEELABRATOR & PANGBORN Dust Collectors, various capacities & sizes
2—TESSMER Sprue Cutters, Models H & I
1—TABOR C10AF Cut-off Saw, 18" wheel, 10 HP motor
1—GROB Band Saw, Type OS-36
3—SLY Tumbling Barrels, square type, 42" x 42" x 48" long
6—SLY Tumbling Barrels, square type, 36" x 36" x 42" long
6—SLY Tumbling Barrels, round, 20" dia. x 42" long
6—SLY Tumbling Barrels, round, 30" dia. x 42" long
12—SLY Tumbling Barrels, round, 24" dia. x 48" long
2—MARSCHKE Swing Grinders, 10 HP & 15 HP
7—MARSCHKE, U. S. & SAFETY-RITE Snag Grinders, 7½, 10, 15, 20 & 25 HP, Wheel sizes from 14" x 2" to 30" x 12"
2—GARDNER Vertical Disc Grinders with work tables, 18" x 24" wheels

CORE ROOM EQUIPMENT

1—CHAMPION Model CB-15 Core Blower
9—DEMMLER #1 Core Blowers with clamping
11—DEMMLER #2 Core Blowers with clamping
3—REDFORD #1 Core Blowers with clamping
100—Core Racks—new
2—Core Belt Conveyors, 20" wide x 120' centers
1—LANLEY Single Compartment Core Oven, recirculating
2—Speed-Sifter Riddles
1000—Aluminum & Transite Core Plates
6—LEWIS SHEPARD Hydraulic Platform Lift Trucks
1—KANE & ROACH Core Wire Straightener, Model DX-5
1—MILWAUKEE Core Grinder, Model 70-12
1—STONEY Core Grinder
1—GARDNER #124 Horizontal Disc Grinder
1—SPO Shell Core Blower Model SC-10-DM
1—SHALCO Model MC-5 Shell Core Machine

MOLDING EQUIPMENT

1—BEARDSLEY & PIPER Model DB Sandslinger, 19" head, 4" tip, 2-speed
35—SPO #113J Jolt Squeezers
33—SPO #110J Jolt Squeezers
15—OSBORN #276J Jolt Squeezers
16—OSBORN #275J Jolt Squeezers
6—ARCADE Jolt Squeezers, 10"
4—OSBORN #710 Jolt Squeeze Pin Lifts
4—OSBORN #712J Jolt Squeeze Pin Lifts
2—DAVENPORT Model 28-SA Jolt Rollover Pattern Draw
2—INTERNATIONAL Model RJ Jolt Hand Draw Rollover
2—JOHNSTON & JENNINGS #612 Jolt Rollover Draw
1—TABOR 30 x 40 Jolt Rollover Pattern Draw
2—SPO #413 Jolt Squeeze Rockover Draw
2—OSBORN #559 Jolt Pin Lift

500—Steel Flasks, various sizes
500—HINES & FREMONT Slip & Pop-off Flasks & approx. 1000 Jackets with Boards

4—INTERNATIONAL Type G Jolt Rollover Pattern Draw, various sizes
5—OSBORN #601 Jolt Rollover Pattern Draw
4—OSBORN #602 Jolt Rollover Pattern Draw
2—INTERNATIONAL Model JDP, 1200# Jolt Pin Lift
1—INTERNATIONAL Model JDP, 1600# Jolt Pin Lift
2—JOHNSTON & JENNINGS 12" Cylinder Jolt Squeeze
2—JOHNSTON & JENNINGS #612RBP Jolt Rollover Pattern Draw
2—OSBORN #42 Core Rollovers
2—OSBORN #40 Core Rollovers

MACHINE TOOLS

1—ATLAS Table Saw
1—DO-ALL Band Saw, V-36
1—HEPTON AMERICAN Swing Saw
1—NIAGARA Sheet Metal Hand Brake
9—CRAFTSMAN Drill Presses
4—WALKER TURNER Drill Presses
2—WALLACE Band Saws
1—TOLEDO Power Hack Saw
1—JARVIS Portable Grinder
1—FRANK H. LEE Planer, 14" x 36"
4—Hand Arbor Presses
1—SOUTH BEND Bench Lathe
3—Surface Plates

MATERIAL HANDLING EQUIPMENT

1—EUCLID 40' span, 3 ton Crane, floor operated, AC, with runways
12—INGERSOLL RAND Air Hoists, 500, 1000, & 2000 lbs capacity
100—Skid Boxes, 30" x 48" & 24" x 48", with 12" skids
6—THOR Air Hoists, 2000 & 4000 lbs capacity
4—YALE "Cable King", 1000 & 2000 lbs capacity
1—CLARK Fork Lift Truck, 2000 lbs capacity
1—TOWMOTOR Model LP48, 5000 lbs capacity
6—AUTOMATIC Electric Transporters, 6000 lbs capacity
2—HOUGH Model HA Payloaders, 12 cu ft capacity
1—BAKER-RAULANG with Ready Power Unit, 4000 lbs capacity
4—LOUDEN & AMERICAN Bridge Cranes with End Trucks
1—BELL Prime Mover
2000'—MATHEWS Roller Conveyor, 12", 14" & 16" widths
15—ROUHRA Dump Buckets, ½, ¾, & 1 cu yd capacity

MELTING EQUIPMENT

2—ROOTS Positive Cupola Blowers, 50 HP synchronous motors & controls
2—FOXBORO Controllers—new
4—MODERN Geared Ladles, 1000, 1200, 2000 & 3000 lbs capacity
3—MODERN Pouring Devices with Ladles
12—Modern 1-ton Ladles, covered, with hand tilting device
7—WHITING Bottom Pour Ladles, 4-ton capacity
1—AJAX TAMA WYATT 20 KW Induction Melting Unit
1—REDA Size 550 Melting Furnace

SAND TEST EQUIPMENT

Rammers, Permeability Meters, Rotap Riddle, Sand Strength Machine, Lab Ovens, Scales, Balances, Pyrometers, etc.

1—STROMAN Dip-out Model DC Reverb Furnace, 1000 lbs capacity
1—ECLIPSE Model E-1000 Reverb Furnace, 1000 lbs capacity
1—INGERSOLL RAND Cupola Blower, 40 HP motor
1—INGERSOLL RAND Cupola Blower, 85 HP motor
1—BONDACTOR Model 1250L Cupola Lining Gun

SAND MULLERS & MIXERS

1—SIMPSON #1 Style H
1—BEARDSLEY & PIPER #40, air cooled with dust hood
3—BLYSTONE Model BI Mixers, 7 cu ft
1—DRAVO DOYLE Mixer on Pneumatic tires
1—PEKAY #160-1-24 Mixer Muller, single stage, 230 tons per hour
1—KNICKERBOCKER Cement Mixer, Portable

SAND HANDLING EQUIPMENT

2—NATIONAL 24" x 20' Belt Conveyors
2—NATIONAL Bucket Elevators, 14 x 7" Bucket, 34' high & 60' high
2—LINK BELT 5' x 10' Shakeouts
1—ROYER Shakeout, 1' x 5'
1—LINK BELT 48" x 230' centers, Leak-Proof Hot Castings Conveyor
1—NATIONAL 24" x 30' Magnetic Belt Conveyor
1—NATIONAL #C-3 Aerator
1—FARQUHAR Portable Conveyor, 12" x 15' long
2—FARQUHAR Undercar Unloaders, 18" x 30' centers
1—JEFFREY Bucket Elevator, 65' high
1—JEFFREY #5 Vibrating Feeder, 24" x 9'

SAND PREPARATORS

5—BEARDSLEY & PIPER Model S & M Screeenerators
2—ROYER Model NDS Sand Preparators
1—NEWAYGO Reddy Sandy, Model RSVM with Mag. Pulley
1—ROYER Scrap Control Unit, Model S-522-9M
4—AMERICAN Sand Cutters, Model AA & AM
2—MOULDERS FRIENDS, 50" & 60" Brush Length

MISCELLANEOUS

200—Doors of Clothes Lockers—new
1000—Flask Weights
5000—Aluminum & Wood Bottom Boards
3000—Flask Bars
50—Air Tools, Rammers, Grinders & Chippers
5—Man Cooling Fans
8—Time Clocks
6—SUN-ROC Electric Drinking Fountains
2—ECONOMY Paper Balers
2—Embossing Machines
75—Vibrators
18—Speed Reducers
30—Electric Motors
2—Motor Generator Sets
9—Hand Trucks
12—Barrel Trucks
30—Wheelbarrows
25—Parts Bins
4—TOLEDO & FAIRBANKS - MORSE Platform Scales, from 1000 to 6000 lbs capacity
2—ELECTRIC Battery Chargers, MG type

OFFICE EQUIPMENT

1—ADDRESSOGRAPH Plate Maker
1—ADRESSOGRAPH Printer
4—FRIEDEN Calculators
3—ROYAL Typewriters
15—Filing Cabinets
12—Desks & Chairs
4—Tables
6—Cardex Files
8—Time Clocks
5—Air Conditioners, ¾ ton

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THE ACME BARGAIN PAGE

AIR COMPRESSORS
2—INGERSOLL RAND 450 cfm., 100 hp., 220-440 V.
1—CHICAGO PNEUMATIC 225 cfm., 50 hp., 220-440 V.

BELTING
29" x 180' 24" x 152'
24" x 263' 24" x 120'

BLOWERS
GE 10500 cfm., 20 oz., 85 hp., 220 V.
GE 7500 cfm., 20 oz., 89.6 hp., 220-440 V.
GE Centrifugal 6200 cfm. 24 oz., 55 hp. motor
WHITING-ALLIS CHALMERS 5750 cfm., 28 oz., 60 hp., 440 V.
INGERSOLL-RAND 4000 cfm., 60 oz., 100/25 hp., 220-440 V.
SPENCER 2250 cfm., 16 oz., 15 hp., 220 V.
SPENCER 2850 cfm., 16 oz., 20 hp., 220-440 V.
SPENCER 270 cfm., 8 oz., 3 hp., 220-440 V.

CONVEYOR OVERHEAD CHAIN
1700' JERVIS B WEBB and LINK-BELT #678 with trolleys 36" centers. 2-5 hp. Variable speed caterpillar drives, & motor generator set, takeups and turns.

CONVEYOR
36" x 162' LINK BELT Oscillating Pan 10 hp., 220-440 V.
36" x 53' LINK BELT Oscillating pan.
17" BARBER GREEN Bucket Conveyor.
30" x 25' Magnetic Belt Conveyor w/drives, 2 hp., 220-440 V.
18" x 10' Steel Apron Conveyor w/drives, 3 hp., 220-440 V.
16" x 120' Rubber Belt w/drives.

CORE BLOWERS
REDFORD Bench types, horizontal or vertical clamping
2—CB15 up to 55# cores, Universal blow plate
C.B. 10 up to 12# cores, 4½" draw.
DEMMLER #4 up to 250# cores.
DEMMLER #3 up to 35# cores.
INTERNATIONAL SB15H up to 150# cores, Hydraulic clamp and draw
INTERNATIONAL SB 13, up to 60# cores
INTERNATIONAL SB 12, medium sized cores
INTERNATIONAL SB 11, medium sized cores
OSBORN 193 up to 50# cores
OSBORN 2035-2 large sized cores

CORE GRINDERS
7—MILWAUKEE 70-9 & 70-12s
1—OWOSSO DE1-303 42" table

CORE OVENS TOWER
COLEMAN Vertical-Horizontal 9000# per hour
COLEMAN Vertical-Horizontal 6800# per hour

CORE PASTE OVENS
COLEMAN 28' Horizontal

CORE ROLLOVERS
INTERNATIONAL REDP Rollover 12" draw

CRANES
P&H 5 TON Electric Traveling DC motors 50' span
P&H 3 TON Electric Traveling DC motors 50' span
270' Crane Runway and Supports
10 Ton AMERICAN Railmaster Low headroom floor control
10 Ton SHAW BOX electric hoist

CUPOLA GUNS
2—BONDACTOR #1250
BONDACTOR #1000

DUST COLLECTOR
PARSONS 40,000 cfm. cloth bag type

ELECTRIC MELTING FURNACES
SWINDELL 9' Dia. Top Charge cap. 3 ton steel 5 ton iron per hour, 3500 KVA 13800 volt transformer, complete in place
1—"LECTROMELT" 2 TON Size Q 4000# per hour 1500 KVA 13200 Volt
1—"LECTROMELT" Size S 1000# per hour, 500 KVA 7200 volt
LECTROMELT 500#, Size T, 300-375 KVA 2300 V primary, Moore controls, G.E. circuit breaker.

ELECTRIC MELTING FURNACES
SINGLE PHASE
1—DETROIT ROCKING TYPE "LFY" 700# cold charge 7200 volts
1—DETROIT "LFC" 700# & 350# Tapered Shell 2300 V
2—DETROIT "LFC" 350# Tapered shell 7200V
STROMAN 1000# Oil fired, hydraulic tilt.
CAMPBELL HAUSFELD Staty. pot type
FISHER RB100 gas fired crucible

FURNACE TRANSFORMERS
1—"LECTROMELT" 800 KVA, 12000 V., 3 phase
1—WESTINGHOUSE 2500 KVA, 11200 V., 3 phase
1—WESTINGHOUSE 2500 KVA, 13800 V., 3 phase

FURNACES NONFERROUS
1—HEVI-DUTY HD-181-S Pot type Electric
2—400# FISHER Gas Fired Tilting Furnaces
4—600# FISHER Gas Fired Tilting Furnaces
1—600# FISHER Gas Fired Stationary Furnace
1—DETROIT "LFA" 350# shell 13200 V
3—CAMPBELL HAUSFELD gas fired 625# brass hand tilt

GRINDERS, SNAG
FOX 24" x 2" Single Wheel 10 hp.
2—HAMMOND 20" DE 10WR1 10 hp., 220-440 V.
1—HAMMOND 20" DE Porter Cable backstands 10 hp.
1—HAMMOND 24" x 2" x 12" 7½ hp., 220 V.
HAMMOND WR-2, 2 speed, 30" x 3" wheel

GRINDERS, SWING FRAME
2—MARSCHKE 3 hp., 12" wheel
1—B&D 7½ h.p.
MARSCHKE 24" x 3" x 12" 20 hp., 220 V.
U.S. 24" x 3" x 12" 15 hp., 220-440 V.
U.S. 20" x 2½" x 6" 10 hp., 220-440 V.

GRINDERS, MISC.
PORTER CABLE BG8 Wet-Dry Belt
U.S. #70 Combination 20" disc and 20" x 3" x 1½" wheel

HEAT TREATING FURNACES
HOLDEN #202 Electrode Type, Bright hardening annealing 1850°
DESPATCH DT36 Pit type 42" x 40" Electric

HOISTS
YALE 5 TON floor control power travel
SHAW BOX 5 TON floor control Hand travel
4—INGERSOLL-RAND Air trolleys
1—500# INGERSOLL RAND LC-4
4—CLEVELAND 2000# Cab type hot metal carriers

LADLES
1—6000# Industrial Enclosed Geared Crane
1—5000# Modern Enclosed Geared Crane
3—2125# Industrial Enclosed Geared Crane
1—2000# Whiting Enclosed Geared Crane

LADLE MIXING
4000# Industrial, Insulated

MOLD BLOWER
TACCONE TD4 24" x 32" flask

MOLDING MACHINES
JOLT SQUEEZE PIN LIFT
2—MILWAUKEE 125-3-21" x 27" Table 8" draw.
7—OSBORN 712 PJ, 18" x 21" Table
1—CHAMPION JSL10P 18" x 21" table 6" draw.

JOLT SQUEEZERS
2—INTERNATIONAL, LJ812 16" x 20" table
1—SPO, 110J Portable 17" x 20" table
4—CHAMPION, JS10P 18" x 21" table
2—OSBORN 275PJ

JOLT ROLLOVER DRAWS
2—1000# TABOR, 30" x 51" table, portable
1020 JOHNSTON & JENNINGS, 60" x 50" table
JOHNSTON & JENNINGS 918, 44" x 64" table, 20" draw, rollout table
2—750# HERMAN 20" x 30" table
20 x 8" INTERNATIONAL type G, 20" x 30" table
2—INTERNATIONAL RJ 20 x 12"
DAVENPORT 28A, 1500#, 29" x 40" Table
1—INTERNATIONAL 50" x 8", type G

JOLT PIN LIFTS
3—INTERNATIONAL 1200-3 26" x 27" table 3" draw
1—INTERNATIONAL 1200 X 8, 26" x 27" table, 3" draw

PIN LIFT PUSHOFF
CHAMPION 28" x 42" table
MILWAUKEE 620ND 20" x 24" table

MULLERS and MIXERS
1—#2 SIMPSON Unit Drive
2—#1 SIMPSON Mullers

SAND CUTTERS
1—SCREENARATOR MODEL "S"
1—ROYER MCZ-43

SAND SLINGERS
2—B&P Tractor 19" heads
B&P 2 speed 40/25 HP double belt
B&P Plate Feeder, 5 ton

SAWS, BAND
30" LAIDLAW, Metal Cutting hydraulic feed
30" TANNEWITZ, 3 hp., 440 V.
42" TANNEWITZ, 5 hp., 220-440 V.

SAWS, CUTOFF
DEWALT ME-3 Abrasive cutoff 18" wheel
DELTA Abrasive cutoff

SCALE
FAIRBANKS PRINTOMATIC 6250#

SCREENS
3' x 8' SIMPLICITY

SHAKEOUTS
3' x 5' SIMPLICITY
5' x 6' SIMPLICITY
5' x 10' LINK BELT

SPRUE CUTTERS
2—PERKINS #53 1¼" stroke
1—MILWAUKEE #85 TON

TESTING EQUIPMENT
ARLIN Automatic Rockwell, continuous type
COLEMAN 55 Spectrophotometer
BALDWIN SOUTHWARK 20,000 Tensile Tester w/load indicator and recorder

TUMBLING BARRELS
2—ROYERSFORD, 42" x 72", chain drive, late
WHITING 60" x 72" 20 hp. drive
SLY 42" x 42" x 64" 10 hp.

WHEELABRATORS
2—42" x 48" AMERICAN Skip Loader
1—27" x 36" AMERICAN Skip Loader

WOODWORKING—PATTERNSHOP
GARDNER 30" DISC and Spindle Sander
JONES SUPERIOR 48" Double Disc.
OLIVER 72DR Router or borer
PORTER 24" Facing Planer
BOICE CRANE 12" Planer
HESTON ANDERSON Swing Saw #5
DELTA 10" UNISAW
NORTHFIELD #4 Tilting Arbor Saw

EKSTROM CARLSON #540 Universal Router Mill Drill

WIRE STRAIGHTENERS
AMERICAN type H rod ⅝"-⅝" cap.
2—#2A CLIMAX ¼"

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UNIVERSAL REBUILT EQUIPMENT GUARANTEED

AIR COMPRESSORS
COMPLETE STOCK—BURY, PENNSYLVANIA, SULLIVAN, INGERSOLL-RAND —SEND YOUR REQUIREMENTS

BLOWERS
25—CENTRIFUGAL 16 oz., 2 to 5 HP
10—GE, WILBRAHAM-GREEN, FISHER Positive Pressure & Cent, Cupola Blowers

CLEANING EQUIPMENT & TUMBLING BARRELS
1—AMERICAN 48" Swing Table
1—AMERICAN 27" x 36" WHEELABRATOR TUMBLAST
1—AMERICAN 36" x 42" WHEELABRATOR TUMBLAST
1—AMERICAN 42" x 48" WHEELABRATOR TUMBLAST, w/loader
1—AMERICAN 36", Continuous WHEELABRATOR, side discharge, two head, Serial #A95643, New 1953. Used 2 months
1—PANGBORN 6' TABLE-ROOM, Type LK
1—PANGBORN TABLAST, 8' Table
1—WHITING 36" x 72" Round w/gear head motors & brakes
1—SLY, Twin Unit, 40" x 24" Round, 10 HP
1—SLY, 68" x 32" Round
10—WHITING 36" x 36" x 72" w/gear head motors & brakes

CONVEYORS
1—HEWITT ROBINS Vibrating, 18" x 10'
1—JEFFREY, 3 compartment, ingot mold
1—LINK BELT, vibrating, double deck, 80' x 24", w/exhaust hood
1—LINK BELT, CAR type mold, 114 cars, 403' track, car size 18" x 42"
2—LINK BELT, 30" Steel Apron Conveyors, 100' Centers
4—SAND ELEVATORS, Various sizes
6—SAND BELTS, 10' ctrs. to 140' ctrs.
2500 FEET—FOUNDRY TYPE ROLLER CONVEYOR—ALL SIZES

CORE BLOWERS
1—CHAMPION CB-12
10—DEMMLER #1, #2, #2A, #2K, #3K, #4E
3—INTERNATIONAL SB-13
3—OSBORN #91, #192, #91-10
1—RANDALL MODEL "A", Bench Type
1—TACCONE #4D, 10" Draw Stroke Cyl.

CUPOLAS
1—MORRIS #9, Skip charger, Blower, Mixing Ladle, Never Installed
1—SKIP CHARGER for #9 Cupola with scale and buckets
1—WHITING Skip Charger for #5 Cupola

DUST COLLECTORS
1—AMERICAN WHEELABRATOR, Model #115KD, 20' L x 9' W x 9' H
10—ROTOCLONE #12, Type N, #14D, #16W, #20D, #24W, #30W

FURNACES—DIRECT ARC MELTING
1—250 Lb. LECTROMELT, Side Charge
1—3000 #/hr LECTROMELT
1—3000# HEROULT
1—500# LECTROMELT
1—3 Ton SWINDELL Top Charge

FURNACES—INDIRECT ARC
1—350# DETROIT LFA
1—750# DETROIT LFY, Conical Shell
1—1000# DETROIT AA, 300 KVA
1—3000# DETROIT C, 500 KVA

FURNACES—INDUCTION MELTING
1—3 KW, AJAX, Lab type
1—20 KW, AJAX SPARK GAP, High Frequency
1—50 KW AJAX 100# Cap. MG set
1—100 KW Water Cooled, 300# Steel—NEW
2—150 KW AJAX, Brass Melting
1—333 KW AJAX 1000#

MUST SELL NOW

3 Ton Top Charge SWINDELL ARC FURNACE

Unit is in Excellent Condition, Dismantled, ready for Immediate Delivery.

IMMEDIATE DELIVERY

FURNACES—GAS & OIL
1—FISHER MNP, Gas Tilting, 1700# cap. Mag.
1—500# FISHER MNP, Gas Fired
1—400# FISHER, Oil, Stationary
1—250# FISHER, Oil, Tilting
3—HAUSFELD, Stationary, Gas, 250# to 1000# capacity
1—HAUSFELD, Tilting, 1200# capacity
1—STROMAN, Gas, 1000# cap. Alum., auto control hyd. tilt.

FURNACES—HEAT TREAT
1—2' x 3' x 6' deep, gas fired, 1800° F.
1—20" x 24" deep, L&N Homocarb electric
1—20" x 36" L&N Draw electric

GRINDERS
1—5 HP CINCINNATI, 2/60/110
1—5 HP GARDNER, 12" x 2½" wheels
1—7½ HP U. S. 2300-8400 RPM, 14" x 2" wheels
1—7½ HP U. S. 3/60/220, 20" wheels
1—7½ HP U. S. Model 66, 14" x 3" wheels
1—10 HP U. S. Model 65, 20" x 3" wheels
3—10 or 15 HP SWING FRAME, 22" wheels

MOLDING MACHINES
Jolt Rollover Pattern Draw
1—J & J #1020, 50" x 60" Table, 3000#
2—J & J #918, 44 x 54 Table, 20" draw
1—J & J #815, 30" x 40", 15" draw, 1200# jolt
2—HERMAN 10,000#, 48" x 109" table
1—HERMAN 6000#, 50" x 72"
1—HERMAN 3000#, 30" x 66" Table
2—HERMAN 1500#
1—HERMAN 750#, 30" x 36"
2—INTERNATIONAL, 13" x 17" table, 6" draw
1—OSBORN #602, 36" x 26", 900#
1—OSBORN #405, 3000#, flask size 64" x 50", 18" draw
1—OSBORN #42, 15" x 20", hand draw
4—TABOR 40" x 60", 1500 & 3000# capacity
2—TABOR, 30" x 40" w/air clamps, 1000#
1—TABOR 22" x 42", pattern draw, shockless, portable
1—TABOR, 20" x 30" w/air clamps, 1000#
2—TABOR, 14" x 16" Rockover
Plain Jolt
5—DAVENPORT, table sizes 24" x 27", 30" x 30" 1200# to 1800#
1—SPO #58P, 18" x 28" table, 800#
Jolt Pin Lift
1—HERMAN #4317, 22" x 30" table
1—J & J #681-C, 30" x 25" table, 600#
1—MILWAUKEE #1536, 32" x 38", 1500#
1—OSBORN #559, 25" x 30" table, 6" draw, 1200#
3—SPO #305, #307, 750 lb., 1500 lb.
1—TABOR, 17" x 20" table, portable
1—TABOR, 20" x 20" table, hand strip
1—TABOR, 20" x 24" table, 600#
Jolt Squeeze Pin Lift
2—INTERNATIONAL, PKL, 18" x 24" table, 12" sq.
1—MILWAUKEE #126, 21" x 27" table, 12" sq., 1200#
2—MILWAUKEE #163, 15" x 24" table, 11" sq.
5—OSBORN #712J, #712PJ, 18" x 28" table, 12" sq.
1—OSBORN #716PJ, 22" x 34" table, 1250#
5—SPO #2114P, 21" x 27" table, 600#
2—SPO #2136G, 21" x 30" table, 800#
Jolt Squeezers
4—INTERNATIONAL #10 LJS, 17" x 20"
1—MILWAUKEE #104-5JS, 17" x 21", port.
1—NICHOLS #12 F-P, portable, 600#
31—OSBORN #275J, #275PJ, 17" x 20" tables, 10" sq., 400#
2—SPO #110J, 17" x 20" table, port.
8—TABOR, 3" jolt, 17" x 20"

MATERIAL HANDLING
1—BYERS, Mobile Crane, BUDA Engine, 50' Boom, 5 ton w/magnet & bucket
1—CLARK, Fork Lift, Gas, 3,000 lb., capacity, Solid Tire

MULLERS AND MIXERS
1—B&P #60 Speedmullor, 10 cu. ft. batch
1—B&P #70 Speedmullor, 6'5" Dia., 15 cu. ft. batch
1—B&P #40 Speedmullor, 5 cu. ft. batch
1—B & P, Conventional, SIMPSON type, 87½" Dia., arranged for cooling
2—LANCASTER Mixers, #4, 5' Dia. Pan. 3-9 cu. ft. cap.
1—MULLER Plaster & Mortar Mixer, 3 cu. ft. batch, Pneumatic Tires
2—SIMPSON #0, U.D. 3' Dia., never used
1—SIMPSON #1, 4' Dia., Style U.D. 4 cu. ft. batch, with loader
1—SIMPSON #1, 4' Dia., Open Gear, 4 cu. ft. batch
1—SIMPSON #1½ Style U.D., 4'6" Dia., 6 cu. ft. batch, with loader
1—SIMPSON #2, 6' Dia., 14 cu. ft. batch
1—SIMPSON #3, 8' Dia. Unit Drive, with loader 20-25 cu. ft. batch
1—SIMPSON #2 Style U.D., 6' Dia., 14 cu. ft. batch

LADLES AND POURING DEVICES
Bottom Pour
2—MODERN Crane Type, 55" H x 50" top
1—MODERN Crane Type, 60" H x 50" top
Lip Pour
1—WHITING 42" x 42" top dia., geared
Cylindrical
8—WHITING, 26" L x 25" dia., 1100# iron
7—WHITING 19" L x 25" dia., 600# iron
3—WHITING, 38" L x 28" dia., 2200# iron
Pouring Devices
7—WHITING, 850# to 2000# gross cap.

OVENS
1—COLEMAN, Gas, 2 Comp. and 5 drawers, OD. 22" x 12' x 10'
3—GENRICH, Elec., 3 drawer, preheating, auto-control, 9' H x 8' W x 6'7" L
1—KOCHS BROS. Electric, 36 x 40" x 64" inside
2—ROSS, Gas, 2 compartment, recirc., rack type, 6½' x 14' x 7'

SAND CONDITIONING
2—B & P Screenarator, Model "M"
1—JEFFREY Sanditioner, Portable, 10-15 tons/hour, 2 H.P. Motor
1—NATIONAL ENGINEERING SAND-PREPARATOR Unit w/permanent magnet pulley
1—ROYER PREPARATOR, Comb. Model NDC, 25 Ton/hr. Scrap removal, 8' x 8' hopper
2—ROYER, NDP 15-25 tons/hr., 2 HP Motor
2—ROYER, NC-2, 10-15 tons/hr., 1½ HP Motor

SAND CUTTERS
1—AMERICAN, 15 HP, 96/78 Reel
1—AMERICAN, 10 HP, 48" Reel

SAND SLINGERS
1—B&P Tractor Type, 19" head
1—B&P Tractor Type, 16" head

SHAKEOUTS AND SCREENS
1—HEWITT ROBINS, Vibrex screen, 3' x 8'
3—SIMPLICITY, 3 x 8, 5 x 8, 8 x 10

MISCELLANEOUS
1—HOWE WEIGHTOGRAPH SCALE, Model 1700
1—KANE & ROACH WIRE STRAIGHTENER, Model DX-5
1—PATTERSON-KELLEY Twin Shell Dry Blender, 3 cu. ft. capacity
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2—YALE ½ ton.

BUCKET ELEVATORS

12—LINK BELT & JEFFREY, 30, 40, 50, 60 ft. cc, 10 x 7, 12 x 7, 14 x 7 buckets.

CUT-OFF MACHINES

2—AMERICAN H-Rod Straighteners.
1—DeWALT ME 2, 10 HP, 24" Blade.
1—GROB Band Saw, Type OS-36.
TABOR C10AF—18" wheel, 10 HP.
3—TESSEMER H & I Spur Cutters.

CORE BLOWERS

3—CHAMPION Model CB-10, CB-18, & CB-400. From 10 to 300 lb. Cores.
22—DEMMLER Model Nos. 1, 1E, 2, 2E, 2K, 3, 3E, 3K, 4, & 4E. From 10 to 100 lb. Cores.
7—INTERNATIONAL Model SB-11 & SB-13, SB-15H, 15 to 30 lb. Cores.
6—OSBORN Nos. 91, 92, 192 and 193. From 10 lb. to 75 lb. cores.
3—MILWAUKEE #3A Bench Type.
1—SPO Model SC-10-DM Shell Core Blower.
1—SAN-BLOW, Model CB-40-B, 40# Cores.

CORE OVENS

1—CARL MAYER 2-Compartment, oil fired, I.D. 7' W x 14' deep x 8' H each.
1—INDUSTRIAL "Revolving Carriers" continuous, 18" x 80" trays.
1—THERMONIC Model M800A Dielectric. Cap. 900#s per hour.
1—YOUNG BROS. 6' x 6' x 9' double door, rack type, gas fired.

CUPOLA BLOWERS & EQUIP.

1—SPENCER 150 HP 7500 CFM 48 oz.
6—I & R Centrifugal 30, 50, 85 and 100 HP, 3500 to 10,500 CFM w/blast gates.
1—ROOTS 7,000 CFM, 50 HP motor.
1—ROOTS CONNERSVILLE Type RCS Size 20 x 60 w/75 HP motor.
1—MODERN No. 3½ Cupola.
1—CUPOLA Bondactor, style 1205-L.
1—WHITING No. 6 Cupola.

ROTO-CLONES WET TYPE

9—AMERICAN AIR FILTER Type N&W, Sizes No. 10, 20, 24, 27, & No. 30, w/sludge ejectors, cap. to 30,000 CFM.

ELECTRIC MELTING FURNACES

1—AJAX 20 KW Induction Unit.
1—TOCCO 20 KW Induction Unit, 9600 cycles.
3—AJAX No. 100 & 300 Furnaces Only.
1—DETROIT Size CM — 4000# Cold Charge, 8000# Molten Metal, w/1000 KVA transformer.

GAS & OIL FIRED FURNACES

23—LINDBERG FISHER Model MNP electric Tilting. Sizes 150, 400, 600, 1000, 1500, 2000 & 2400#, aluminum capacities. Gas or Oil Fired.
29—LINDBERG FISHER & CAMPBELL, HAUSFELD Stationary, Sizes 100, 150, 200, & 550 capacity. Gas or Oil Fired.
1—STROMAN Model JC Cradle Type Hydraulic tilt, 2000# capacity. Iron.
1—STROMAN, Model "U," 600# Reverberatory Hand Tilt.

HEAT TREAT FURNACES

1—DESPATCH Model DT-26, 38" diameter x 26" height, gas fired recirculating, 1250°, pit type.
1—SURFACE COMBUSTION, 54" x 96", box-type, gas fired, 1850° F.

GRINDERS

Swing Frame

1—MARSCHKE 20" x 10" wheel, 10 HP.
2—FOX No. 6, 24" x 10", 15 HP.
3—MARSCHKE 24" x 3" wheel, 15 HP.
2—U. S. ELEC. Model 24, wheel 24" x 3".
1—MUMMERT-DIXON #2420, wheel 24" x 3".

Snagging

2—U. S. #64, 20" x 3", 7½ HP, 4 speed.
2—SAFETY #174, 24" x 3" wheel 10 HP.
2—MARSCHKE 24" x 4" wheel, 20 HP.
1—U. S. #65, 30" x 3", 30 HP, 4 speed.

Core

2—MILWAUKEE 70-12, 70" dia. table.
1—STONEY Core Grinder, 16" dia. Wheel.

Horizontal - Disc

GARDNER No. 124—53" wheel, 20 HP

LADLES

17—MODERN & WHITING Cylindrical Ladles, 275, 1500, 2450, & 3000 lbs. capacity. All Enclosed Gears.
12—MODERN Model F-9 and FA-9 Pouring Devices, with ladles 400 to 800 lbs.
37—MODERN & WHITING Lip Pour, Enclosed Gear, 1200, 1600, 2000, 4000, 6000, 7000, 8000, & 80,000 lbs. capacity.
7—MODERN & WHITING Cylindrical Mixing Ladles, 2 & 3 ton capacities. Electric & Manual Tilting.
7—WHITING Bottom Pour 4 ton.

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MOLDING MACHINES

Jolt Squeezers

37—OSBORN, 8PO, MILWAUKEE, Portable & Stationary, 10" Squeeze Cyl.
13—OSBORN, MILWAUKEE & 8PO Portable & Stationary, 12" Cylinder.

Plain Jolt

1—HERMAN 40" x 58" table, 3000# cap.
1—HERMAN 8' x 12' table, 32,000# cap.
1—J&J 50 x 72 Table—5000# cap.

Jolt Rollover Pattern Draw

1—DAVENPORT 28-8A, 29" x 40" table.
2—DAVENPORT 40-8A, 42" x 50" table.
3—HERMAN 1500 lb. Series, 26" x 48".
1—HERMAN 750 lb. Series, 20" x 30.
2—HERMAN 4000 lb. Series, 40" x 60".
14—INTERNATIONAL Type G, Sizes 20" x 8" 24" x 10".
1—INTERNATIONAL RES Size 15" x 8".
2—J & J #612, 24" x 30" Table.
4—J & J #918, 44" x 54" Table.
1—J & J #815-B, 30" x 40" Table.
1—MILWAUKEE #167, 32" x 33" Table.
1—MILWAUKEE #60B-3, 60" Flask.
10—OSBORN #40 and 42 Core Rollovers.
1—OSBORN #442, 21" x 31" Table.
2—OSBORN #242W, 29" x 42" Table.
12—OSBORN #601 & 602, 30" & 36" Wide Flask, 10" draw, 750 lbs Cap.
2—OSBORN 643 Table 35 x 50—2000#
1—SPO #413D, 24" x 25" Table.
1—SPO Model 9336, table size 22" x 28".
1—SPO Model 508, table size 28" x 30".
1—SPO 506—24" x 30" Table 10" Draw.
3—TABOR 30" x 40" Table, 12" Draw.
4—TABOR 22" x 32" Table, 10" Draw.

Jolt Pin Lift

3—INTERNATIONAL JDP 1600 X 10" draw, 36" x 36" table.
2—OSBORN #559, 25" x 30" Table.
2—MILWAUKEE #2542, 38" x 42" Table.
1—SPO #3058, 22" x 28" Table.
1—SPO #3102—42" x 50" Table.

Pin Lift

9—INTERNATIONAL & B & P Speed Draw. Used with Sand Slinger. Cap. 600 to 2000 lbs., up to 30" x 40" flasks.

Jolt Squeeze Pin Lift

1—MILWAUKEE #125, 21" x 27" Table.
1—OSBORN #712-V, 18" x 26" Table.
2—OSBORN #710-J, 17" x 21" Table.
4—INTERNATIONAL PKL, 17" x 26".
1—INTERNATIONAL PK-20, Size 20" x 8".
1—OSBORN 716 PV—22" x 34" Table—16" dia sq cyl.

CONVEYORS

Steel Apron

9—JEFFREY & LINK BELT 24", 30", 36", widths. Lengths built to your specifications, with reducers & motors.

Oscillating & Vibrating

1—LINK BELT 48" x 154', 20 HP Motor.
7—JEFFREY TAYLOR No. 5 Vibrating Feeders 24" wide x 7'.

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2500' MATHEWS 6", 12", 18" & 20" wide. 2 3/8" dia. roller, 1 1/2" hex shaft centers, 4" channel.
500—MATHEWS 12" & 36" wide, 3½" dia. 1" hex shaft on 6' centers, 6" channel.

Mold

3—LINK BELT 88 Cars 20" x 48", 350' track, with automatic dumping.

Belt

LINK BELT & JEFFREY 18", 24" & 30" wide. Flat or trough idlers, all Timken bearings. Built to your specifications. Can be equipped with molders hoppers & Ploughs.

MOLDERS HOPPERS & STORAGE BINS

7—NATIONAL & LINK BELT Storage Bins, 60 to 150 tons cap.
42—MOLDERS Hoppers 1½ ton cap.

SAND MULLERS

1—B & P #40 Speed Muller, 6 cu. ft.
1—B & P #50, SpeedMullers, 9 cu ft.
1—B & P #60, Speed Muller, 12 cu. ft.
2—B & P #70, Speed Mullers, 18 cu. ft.
2—CLEARFIELD No. 610 w/skip hoist loaders, 10 to 14 cu. ft. batch.
1—DRAVO-DOYLE 6 cu. ft. cap. Port.
1—LINK BELT 48" x 8' Paddle Type.
1—PEKAY No. 160-1-24 Mixer Muller, single stage for 24" belt, 230 TPH
1—SIMPSON No. 1H Style UD—500#
1—SIMPSON #1½, Style UD, 700 lb., w/loader.
2—SIMPSON #2, Style C, 1500# w/loader.
2—SIMPSON #2, Style UD, 1500# w/loader.
3—SIMPSON #3, Style C, 3000 lb.
3—SIMPSON #3, Style UD, 3000 lb.
2—Mixer Muller, 6 cu. ft. paddle type.

SAND PREPARATORS

2—NATIONAL #3 Style C Aerators.
6—ROYER Complete conditioning units including Shakeout, Belt Conveyor and Sand Blender.
6—B & P Screenerators, Models S, M & L.
8—ROYER Models, NC-4, NDS, NDP.
6—AMERICAN Sand Cutters, Model M, Sizes 79/60, 89/70, 99/80. All late.
4—AMERICAN Model AA and AM, 45" & 60" Cutting Blade.
1—ROYER S-522-9M Scrap Control 60 ton per hour capacity.
1—AMERICAN "Sand Master," 102"/70" cutting blade—1952.
1—MOULDERS' FRIEND 60" Brush.

SANDSLINGERS

1—B & P Motive Jr., 300 cu. ft. tank.
2—B & P Tractor Type 19" head & 16" head, 13' arms. Magnetic towers.
6—B & P Models DB Stationary Sand Slingers, 16", 19" and 22" heads, with 20, 25, 40 and 50 HP motors. All late.
2—B & P Swing Type Slingers 19" head.
4—B & P S ton plate feeders.
2—B & P 35 ton capacity plate feeders.

SHAKEOUTS & SCREENS

2—LINK BELT 5' x 10', 6 ton cap.
1—SIMPLICITY 4' x 10' Model D.
1—SIMPLICITY 5' x 8', Model D.
1—NATIONAL ENG. 5' x 8' Hex Screen.
1—HEWITT-ROBINS 36" x 78" Vibrex.
1—SIMPLICITY 4' x 10' Model B, Single deck sifter screen, 10 HP motors.
1—HEWITT - ROBINS Vibra - Feeder 30" wide x 60" long.
2—ROBBINS 3' x 4' JF6—2000#
2—ROBBINS 3' x 5' JF6—2000#
1—ROBBINS 4' x 6' JF9—8000#
1—ROBBINS 4' x 8' JF9—10,000#
1—ROBBINS 6' x 10' JF11—20,000#
1—ROBBINS 8' x 10' JF11—30,000#
1—SIMPLICITY 4' x 6' Model B.

SAND BLAST EQUIPMENT

1—AMERICAN 36" x 42", w/skip Hoist.
2—AMERICAN 48" x 42", w/skip Hoist.
1—AMERICAN 27" x 36" w/skip hoist.
1—AMERICAN 48" x 48".
1—AMERICAN No. 1-B Suction Cabinet.
1—AMERICAN #3 Tablast, 4—48" tables.
1—AMERICAN #1 Tablast, 7-14" tables.
1—AMERICAN No. 2A multi-tablast.
1—AMERICAN 20" x 27" Rubber Belt Tumblast.
1—PANGBORN #45, type MT Sand Blast Room 10' L x 8' W x 6' H.
1—PANGBORN No. 53 type EN-2 blast cabinet with dust collector.
1—PANGBORN Model 6-LF, 6' diameter plain table with dust collector.
1—PANGBORN #44NF Shot Blast Room 10' x 9' x 9'.

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CAR TYPE MOLD—23 Cars, Size 34" x 50", w/Track & Drive

INGOT MOLD—3 Compartment —60' Centers

WET SLAGGING—14' Long —w/Drive—2 Slag Cars

CORE BLOWERS

DEMMLER #1	— 10# Cores
DEMMLER #2	— 20# Cores
DEMMLER #2K	— 20# Cores
DEMMLER #4E	—100# Cores
OSBORN #91-10	— 25# Cores
CHAMPION CB-5	— 5# Cores
CHAMPION CB-10	— 12# Cores
CHAMPION CB-12	— 30# Cores

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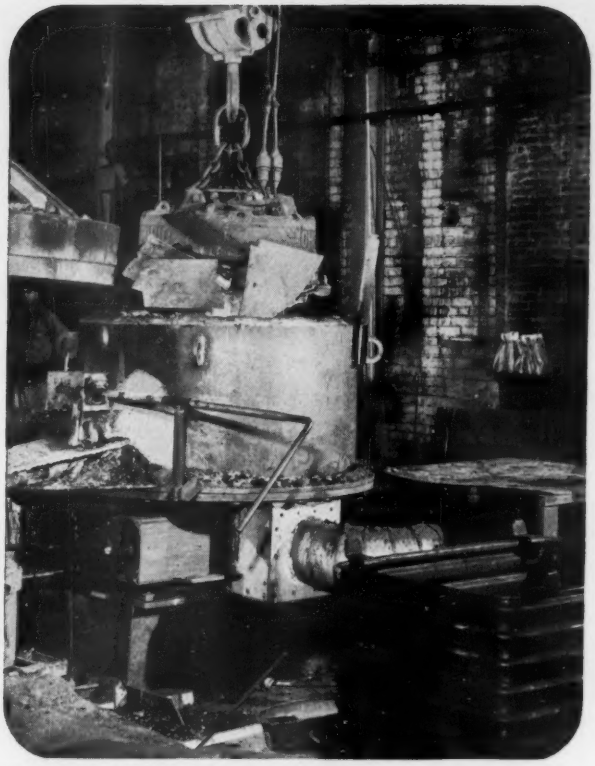
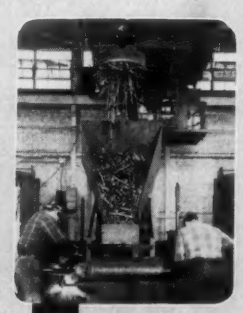


1 CHARGING FURNACE. One 36-inch Ohio Bolted Magnet charges six 375 KW furnaces giving 240 500-pound heats each 24 hours.

2 SCRAP HANDLING. All scrap is handled efficiently, economically with Ohio Magnet. Single 36-inch magnet replaces grapple, clamshell, bucket or lift truck.

3 SORTING. Castings are conveyed from Wheelabrator to hard-iron inspection. Ohio Magnet picks parts out of sorting bins.

4 UNLOADING ANNEALING FURNACE now takes one man 10 to 20 minutes with Ohio Magnet. Lift truck used to take 1 to 2 hours.



5 LOADING GRINDING HOPPER after conveying parts from inspection department. Same Ohio Magnet is used for operations shown in photos 3, 4 and 5.

Photos: Courtesy I-F Manufacturing Company, New Philadelphia, Ohio

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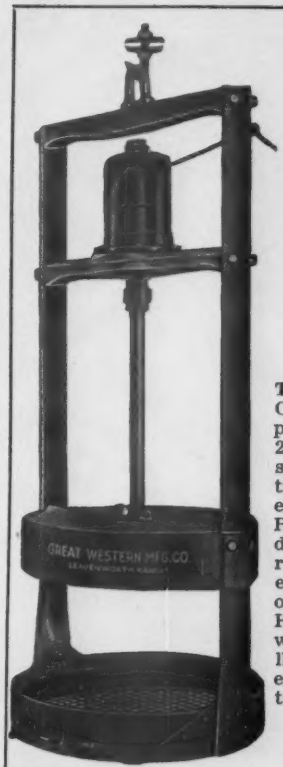

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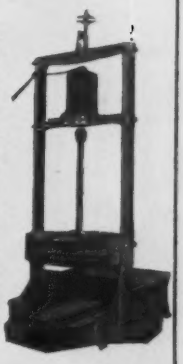

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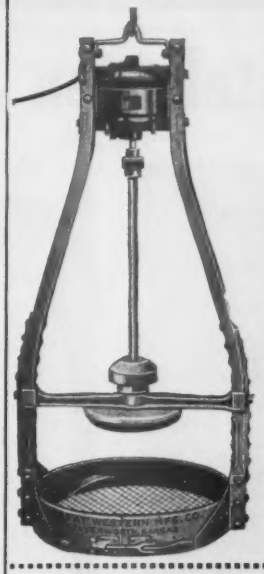

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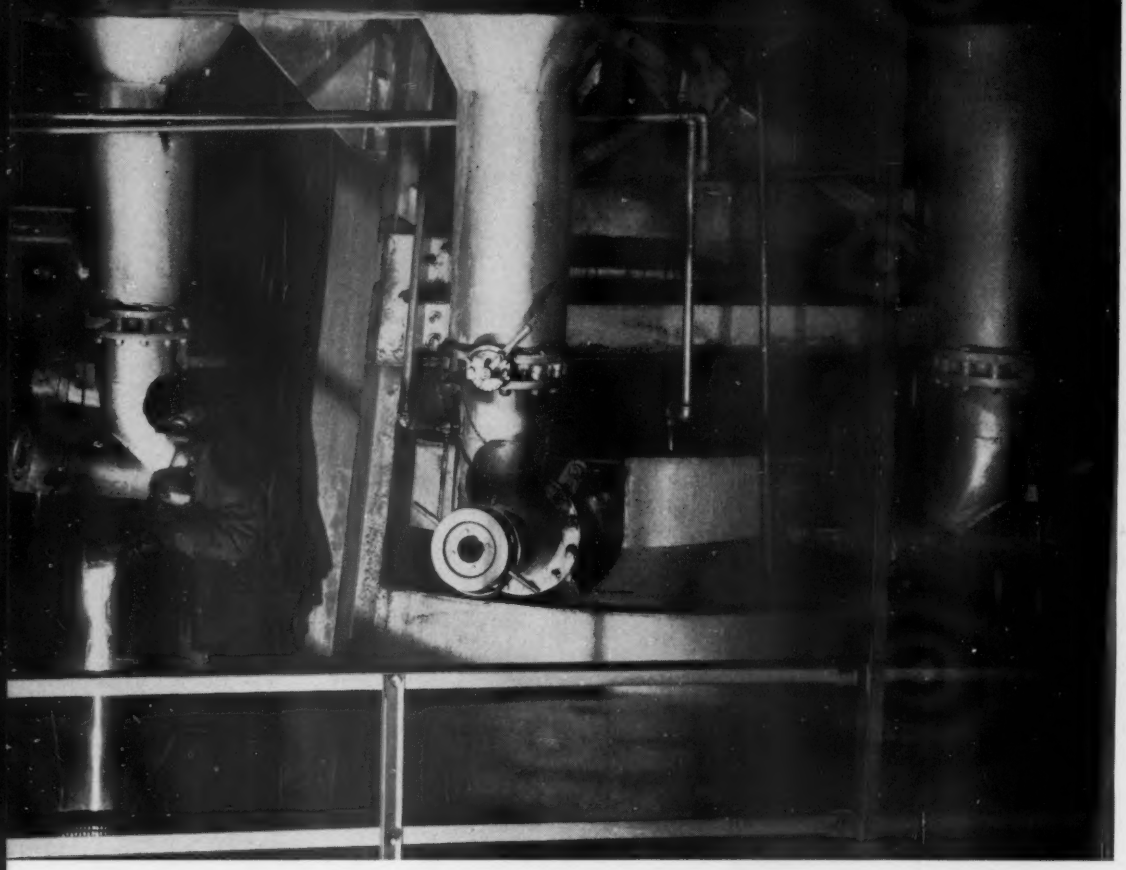

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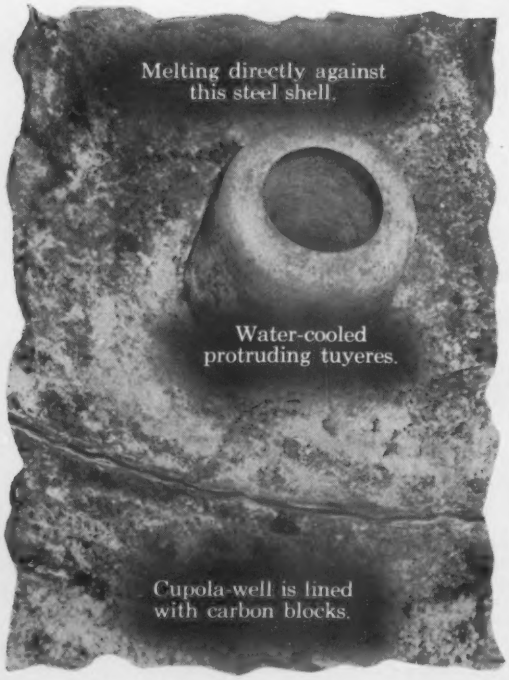

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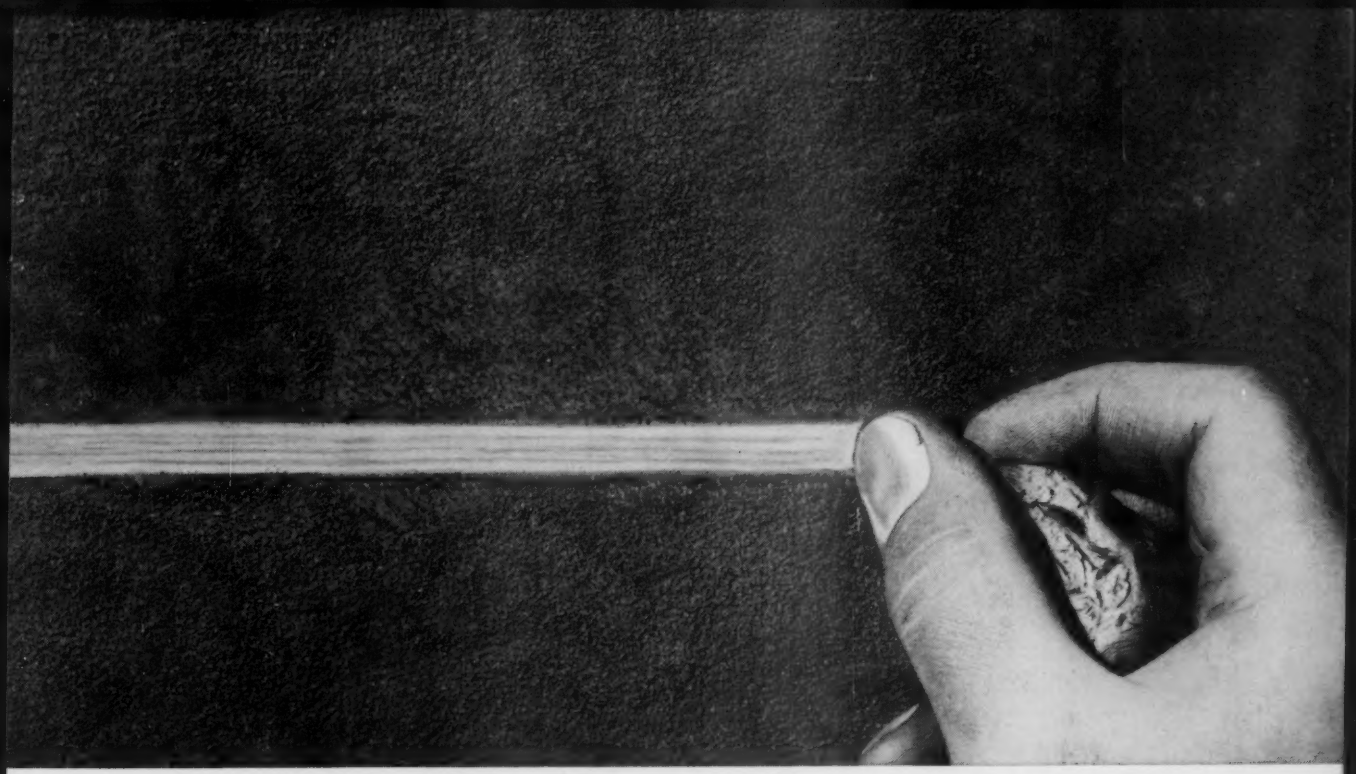

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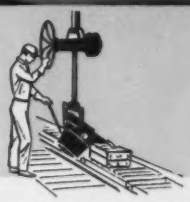

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